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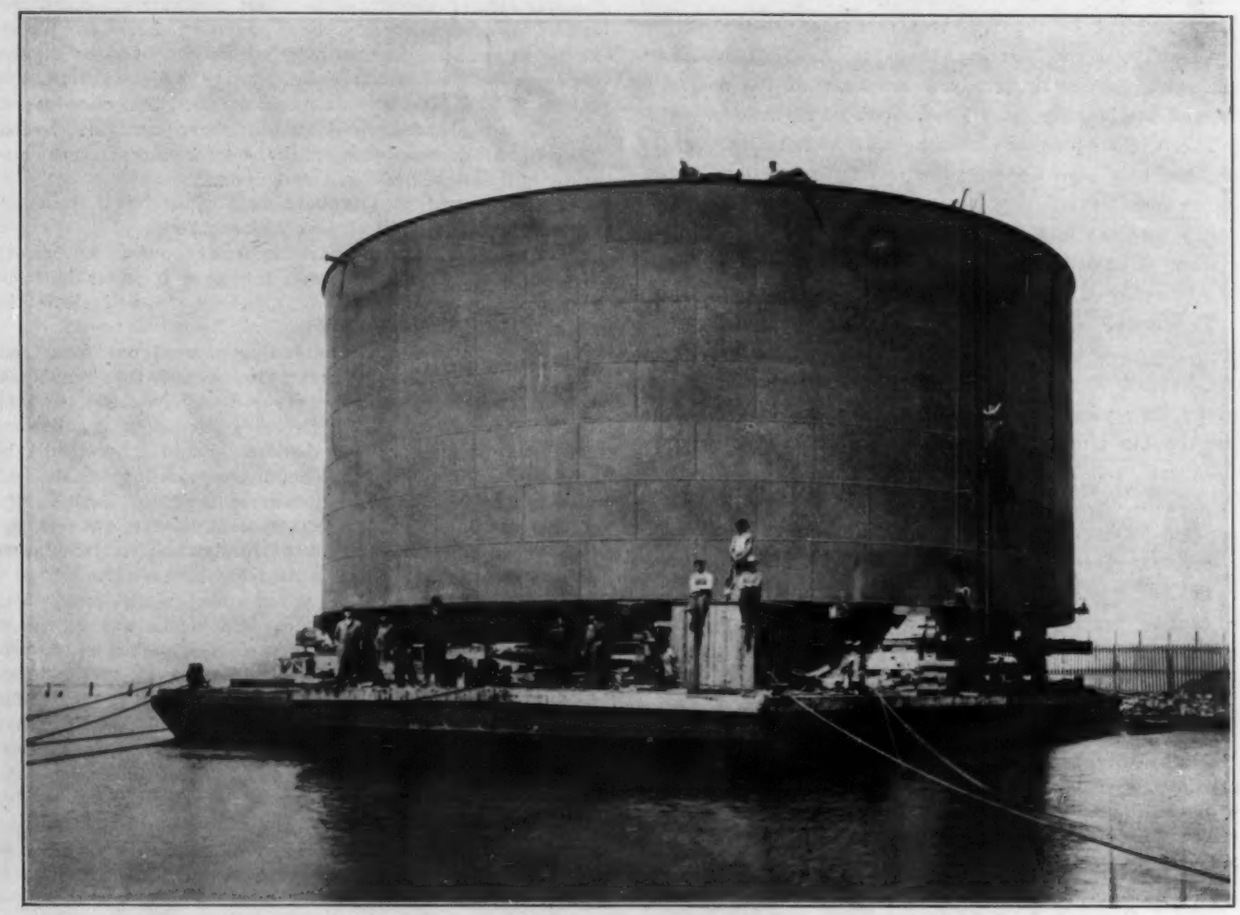
The Engineers', Architects' and Builders' News

VOLUME XIX. SAN FRANCISCO, CAL., OCTOBER 12, 1907 No. 15

MOVING A 30,000-BARREL OIL TANK BY WATER.*

A unique problem in engineering confronted the gas department of the California Gas & Electric Corporation a few months since, when it was desired to move a 29,500-barrel iron oil tank from the old gas plant of the San Francisco Gas & Electric Company at North Beach, to the plant of the Oakland Gas, Light & Heat Co., on the Oakland Estuary. Many plans were considered and abandoned, such as cutting it in sections in different ways, etc., but the cheapest method by half, and the manner in which it was finally solved and the work accomplished, is set forth in the accompanying photographs.



MOVING A 30,000-BARREL OIL TANK BY WATER

The tank has a wooden cover, which is securely fastened to the upper sheets, and supported from the bottom by forty 6x6 uprights, serving to make it more rigid, and able to resist buckling.

To begin with, holes were dug in the masonry foundation in about twenty places around the tank, to receive the jacks; then very carefully and evenly the tank was raised until it was up to a point where more timbers and jacks could be got under the bottom, and the sag, which to our surprise was only from four to five inches, taken out and the whole raised high enough to get the cribbing and large timbers in place.

* Paper read before Fifteenth Annual Convention of Pacific Coast Gas Association.

It was then handled in the same manner as a house, taken about a mile through the streets, around one corner, and to the water's edge; and it is interesting to note that at one point, where it was taking up not only all the street but all the sidewalk as well, that the tank cleared the houses on either side by only about three inches and covered their porches completely.

When all was ready in Oakland, two large barges about 100 feet long were lashed together and the tank run aboard at high tide on June 30th, 1907, as shown in photographs "B" and "C"; the actual time for the work being one hour and twenty minutes.

The next day proving to be free from wind, the voyage across the bay was commenced at 9:15 a. m., in tow of a steam tug, while another tug stayed along side to render assistance in case of need. By one o'clock, the ten-mile journey across the bay and up the channel was finished, and the barges tied to the bulk-head, ready to be unloaded.

An incident of the trip was that the captain of the ferry-boat "Oakland," seeing that the wash of his boat might give us trouble, stopped his boat to let the tank pass, and the late commuters were treated to a novel sight.

The original plan of unloading was to bring the barges up to the bulk-head opposite the foundation at high water, and sink them. It was found necessary, however, to dredge this place, before the tank could be brought over, thus forcing the work of unloading to be done from tide water, and this was accomplished as follows:

Two double rows, of three piles each, were driven between the bulk-head and deep water, about forty feet apart, capped and cross-timbered; and at high tide again, all being in readiness and the barges securely lashed to the piles, the big tank was started on the rollers, as seen in photograph "D," and in forty-five minutes was resting securely again on land.

After being run into position on its new foundation, the reverse operation used in lifting was begun; it was lowered evenly, and the last timbers taken out when a little over a foot from the foundations, and supported only from the outer rim by twenty jacks, set in holes left for the purpose in the edge of the foundation. When all were out, the jacks supporting it were lowered, and the job was completed.

Before lowering, the bottom was carefully painted with tar paint, to protect it against moisture, as was also the top of the foundation.

The tank is eighty feet one inch in diameter by thirty-three feet high, and holds 1,239,189 gallons. The weight is approximately 172,000 pounds, or eighty-six tons, and, although everything went without a hitch, and not a thing happened to cause the least concern, the tank being perfectly tight when tested, every one breathed a sigh of relief when it left its unnatural element and was again on terra firma.

The Order of Rejuvenated Sons of Jove will assemble at the fifth annual meeting to be held on Jupiter's Day, October 15th, 1907, at Dallas, Texas. Many important matters relative to the further "Good of the Order" are to be considered, as well as the annual election of officers. The organization of the Jovian Cloister (The Second Degree of Jovianism) will be perfected at this time.

LAMPBLACK.*

A Composite Paper by Several Members.

In the beginning of oil-gas making, the one residual product was given the name of "lampblack." The separation of this substance from gas by means of water, and the further separation of it from the water, became the bete noir of the oil-gas man, but a longer acquaintance with it has brought out its true worth, and the day will come when the value of lampblack will be so great that it will compel cleanliness, which is now an almost unheard of thing in oil-gas works.

The ancient methods employed for oil-gas making did not produce lampblack, but the modern way of applying high temperatures to the decomposition of oil produces little or much lampblack, according to the degree of heat applied.

Lampblack is not made directly from oil. When oil is plunged into a chamber which is highly heated, its most natural physical change is to become a vapor, and at a higher temperature a gas, as in the distillation of oil at lower temperatures, vapors alone are driven off. These vapors may subsequently be condensed back to liquids again. In the gas generator, it is different. Gas as at first produced from oil is too rich in heavy hydro-carbons, and would not be a good merchantable product, but when passed through more-heated brick work, these unstable hydro-carbons are decomposed at the higher temperature into their components—hydrogen and carbon.

The hydrogen goes forward as a diluent gas, while the carbon goes into the wash box as lampblack.

The breaking down of the hydro-carbons is a complex study in chemistry, which would require a paper in itself to explain, but the foregoing simple facts will show the origin of lampblack.

It is obvious that a material separated out from gas, must exist in extremely fine particles, and the lampblack, as it is separated from the gas by water in the wash box, is a substance consisting of particles finer than the diatoms of the microscopist. This substance should theoretically be pure carbon, but with the impurities existing in the oil, and the foreign matter in the water used for washing the gas, the lampblack of the gas works consists of 98.8 per cent carbon and 1.2 per cent of foreign matter, which we call ash, pure carbon when burned having no ash.

The construction of a self-cleaning wash box, which would remove nearly all of the lampblack, was an interesting study, and was finally perfected, its chief feature being to carry the water which is used for sealing and washing, in pipes to the bottom of the wash box, under considerable pressure, so that the water and lampblack are kept turbulent, and in this condition forced out of the wash box through an opening of circular shape, it being found that any level, sharp surface acted as a skimmer which partly cleansed the water from the lampblack, leaving the lampblack in the wash box. This calls for manual labor to remove it from the wash box, while if the lampblack is kept in suspension in the water, and forced out of the wash box in that condition, the water and lampblack pass together to what is known as a lampblack separator.

This is an arrangement of wooden or concrete tanks with partitions, and the application of the reverse of the wash-box principle—that is to say, the partition should be as sharp and nearly level as possible, so that as the water flows over the sharp edges of the partition, the lampblack is left behind.

In small gas works, it is sometimes necessary to use filter boxes for cleansing the water from every particle of

* Paper read before Fifteenth Annual Convention of Pacific Coast Gas Association.

lampblack. In some works, straw is used in these filters, and it has been found that barley straw is best adapted to the purpose, for the reason it is finer and packs better when it becomes wet. In other separators, screens of burlap are used. In these works, the overflow water runs into the city sewers, and the cleansing of the water is so well done that there have been no complaints from it.

One small works drains its overflow water directly into a trout stream, and a fisherman reported that he found better fishing below the gas works than above it.

This lampblack may be taken up by conveyors and dumped automatically at a distance in convenient piles. After it has partially drained, it still contains 50 to 55 per cent of water, and after having been exposed to the sun for a year, this lampblack will contain as much as 25 per cent of water. This water content makes it a difficult problem to briquette lampblack, although in itself, with the small amount of oil tar, which is intimately mixed with it, acting as a binder, it is an ideal briquetting substance.

A well-ordered gas works should make enough lampblack, which, used as a boiler fuel, will produce enough steam for gas making and the operation of auxiliary apparatus, such as pumps, engines, etc.

In small works, it requires the greatest care and attention to recover all of the lampblack, in order to obtain enough for fuel for steam making, and it is also necessary to gather the oil tar from the scrubbers and mix it with the lampblack, in order to obtain enough fuel.

One writer says that the steam equipment of his plant consists of a seven-horsepower boiler, operating a small engine, attached to a No. 3 Sturtevant blower. Steam was used for gas-making, as well as for heating the oil. The lampblack produced was not sufficient fuel for the boiler, and from 75 to 150 barrels of oil per week were required as additional boiler fuel.

In order to better the conditions of the plant, to the end that lampblack alone should be used for fuel for making steam, all the steam piping in the works was covered with insulating material, and an electric motor was substituted for the engine, to run the blower.

The smaller plants find that the quality of the oil materially affects the output of lampblack, and in one works it is interesting to note that the thick oil used, after a new set was installed, some of the oil being as low as eleven degrees B., caused an accumulation of an over-supply of lampblack, so that some of the lampblack was sold as a fuel to outside purchasers.

The heat of the burning lampblack makes it very destructive to ordinary grate bars, and it was soon found that the only durable grates were ordinary round wrought-iron bars, arranged on corrugated bearers, so that the distance apart of the corrugations regulated the spacing of the grate bars. It has since been found that a round bar of, say, 1¼-inch diameter by 5 feet long, made of cast iron, is more durable and less expensive.

The firing of a boiler with lampblack was at first difficult and unsatisfactory, but it was learned that the fuel should be fired just inside the firing doors of the furnace, at the front of the grate, and allowed to coke; when the furnace needs more firing, it is the custom to shove the coked lampblack back from the front of the furnace, and supply its place with a fresh charge of lampblack. This method seems to work admirably.

Before the last of the coal-gas benches was dismantled, an attempt was made to coke lampblack. It was found that there was not quite enough tar mixed with the lampblack to produce a hard coke, and the admixture of a small quantity of oil supplied this deficiency, so that at the end of eight hours, in an old-fashioned gas retort, at a bright, cherry-red heat, a clean hard coke was produced, which, as will be readily understood, was an ideal domestic fuel, on account of the small quantity of ash present in it. When lampblack coke is placed in an open grate and ignited, each piece of coke glows, and remains in that condition until it is all consumed, there being so little ash in it that the oxygen is not hindered from reaching the carbon surfaces of the coke.

This method of producing lampblack coke was slow and expensive, and a coke oven consisting of eight vertical brick retorts, patterned after a German plan, was constructed. The furnace which heated these retorts was fired by oil; a small quantity of oil was mixed with the lampblack and together charged into the tops of the retorts, and the coke, after from twenty-four to thirty-six hours, was discharged by gravity from the bottom of the retorts. This method was also slow and expensive, and required a great deal of labor for handling and mixing lampblack and quenching the coke, so that coke making from lampblack was abandoned.

The problem of briquetting this substance is fascinating, but extremely difficult. Probably no less than ten different types of presses, vertical and horizontal, wheel and plunger, have been invented, any one of which would have been successful with fine coal, or other easily-compressable substance, free from water; but the only briquetting press which has, up to the present time, given any degree of satisfaction, is an ordinary heavy plunger press, built like a machine for punching iron. The plunger of this press meets a charge of lampblack from a hopper, and compresses it into a long mould with a slight taper, and each stroke of the compressor forces out a briquette about 1½ inches long. This way of making briquettes is similar to the ordinary sausage machine.

One of these presses is now in use at the Potrero gas works in San Francisco, and the product of it is used for water-gas making in a double superheater water-gas set, taking the place of anthracite coal.

A further improvement in this press has been made, the new form being vertical, instead of horizontal, and it is arranged with four plungers, operated by one shaft, thus increasing the capacity of the machine and diminishing the cost of labor in operating it.

Lampblack with from twenty to twenty-five per cent of moisture is being used for water-gas making at the Potrero plant, San Francisco. The process is the same as when anthracite coal is used, excepting that a very small amount of blast on the generator is required.

It requires 35 pounds of lampblack per 1,000 cubic feet of gas, using 5 gallons of heavy crude oil per thousand; this produces a gas of 30 candlepower, containing about 800 British thermal units per cubic foot.

The following is a typical analysis of gas made in this manner:

Carbonic Acid	7.0
Illuminants	18.4
Oxygen	.3
Carbonic Oxide	11.3
Hydrogen	20.5
Marsh Gas	34.7
Nitrogen	7.8
	100.0
British Thermal Units	850
Specific Gravity	.680

Experiments have been made with lampblack briquettes in a water-gas machine, but only for short periods, it being necessary to use lampblack from the pile, as sufficient briquettes could not be obtained.

The indications of these experiments, however, are that lampblack briquettes will equal Welsh anthracite coal as a generator fuel. Without briquetting the lampblack, the water-gas generators produce half the amount of gas that was previously made with coal, but with briquettes the full capacity of the machines is obtained, as the use of briquettes permits the use of a higher blast pressure, and more blue water gas is made. There is very little loss of lampblack in a water-gas generator, as there are no clinkers, and less labor is required to clean the fire.

CLASSIFICATION OF CENTRAL STATIONS.

Prepared by the Co-operative Electrical Development Association.

PURELY ELECTRIC; GAS & ELECTRIC; ELECTRIC & RAILWAY; GAS, ELECTRIC & RAILWAY; MUNICIPAL; 24-HOUR SERVICE AND NIGHT SERVICE.

1	2			3			4			5			6			7			8			9
	Central Stations Purely Electric			Central Stations Electric and Gas Corporations			Central Stations Electric and Railway Corporations			Central Stations Electric, Gas and Railway			Municipal Electric Plants			Summary of 2, 3, 4 and 5			Summary of 2, 3, 4, 5 and 6			
	(A)	(B)		(A)	(B)		(A)	(B)		(A)	(B)		(A)	(B)		(A)	(B)		(A)	(B)		
Population of Cities	Night Service Only	24-hour Service	Total of A & B	Night Service Only	24-hour Service	Total of A & B	Night Service Only	24-hour Service	Total of A and B	Night Service Only	24-hour Service	Total of A & B	Night Service Only	24-hour Service	Total of A & B	Night Service Only	24-hour Service	Total of A & B	Night Service Only	24-hour Service	Total of A & B	Population of Cities
1,000 and Under	721	432	1153	7	67	74	2	42	44	..	13	13	164	18	182	730	554	1284	894	572	1466	1,000 and Under
1,000 to 5,000	1101	813	1914	55	95	150	1	75	76	1	17	18	601	132	733	1158	1000	2158	1759	1132	2891	1,000 to 5,000
5,000 to 10,000	52	213	265	17	92	109	..	49	49	..	11	11	53	49	102	69	365	434	122	414	536	5,000 to 10,000
10,000 to 25,000	14	154	168	7	77	84	..	61	61	..	18	18	22	24	46	21	310	331	43	334	377	10,000 to 25,000
25,000 to 50,000	5	72	77	..	15	15	..	28	28	..	4	4	6	8	14	5	119	124	11	127	138	25,000 to 50,000
50,000 to 100,000	1	38	39	..	9	9	..	6	6	..	3	3	2	1	3	1	56	57	3	57	60	50,000 to 100,000
100,000 to 250,000	6	22	28	..	10	10	..	5	5	..	3	3	2	2	4	6	40	46	8	42	50	100,000 to 250,000
250,000 to 500,000	1	17	18	..	3	3	..	2	2	..	1	1	...	2	2	1	23	24	1	25	26	250,000 to 500,000
500,000 to 1,000,000	..	10	10	..	3	3	..	..	..	..	..	..	...	...	....	....	13	13	....	13	13	500,000 to 1,000,000
1,000,000 and Over	1	7	8	..	5	5	..	1	1	..	1	1	4	1	5	1	14	15	5	15	20	1,000,000 and Over
Grand Total.	1902	1778	3680	86	376	462	3	269	272	1	71	72	854	237	1091	1992	2494	4486	2646	2731	5577	Grand Total
PLANTS LOCATED IN CITIES TABULATED ABOVE—SERVICE BY OUTSIDE AGENCIES, CENTRAL STATIONS, TRANSMISSION LINES, ETC.																						
1,000 and Under	126	264	390	4	66	70	1	34	35	..	12	12	4	5	9	131	376	507	135	381	516	1,000 and Under
1,000 to 5,000	65	217	282	7	60	67	..	46	46	..	17	17	4	4	8	72	340	412	76	344	420	1,000 to 5,000
5,000 to 10,000	2	29	31	..	13	13	..	9	9	..	2	2	..	..	..	2	53	55	2	53	55	5,000 to 10,000
10,000 to 25,000	..	18	18	..	3	3	..	3	3	..	..	..	..	..	..	...	24	24	...	24	24	10,000 to 25,000
25,000 to 50,000	..	2	2	..	...	...	..	2	2	..	..	..	..	..	..	...	4	4	...	4	4	25,000 to 50,000
50,000 to 100,000	..	1	1	..	...	...	..	..	..	..	..	..	..	..	..	...	1	1	...	1	1	50,000 to 100,000
Grand Total.	193	531	724	11	142	153	1	94	95	..	31	31	8	9	17	205	798	1003	213	807	1020	Grand Total

POLE PRESERVATION.

Power companies will profit greatly by an enormous saving to lumber users which will result from the preservative treatment of timber. A few years ago a preservative treatment for telegraph, transmission and other poles, was unknown in the United States, but the constant increase in the cost of the higher grades of timber, and the substitution, in many localities, of inferior woods for the woods formerly used, has made a preservative treatment almost a necessity. The use of the so-called inferior woods is made possible only by the use of a preservative treatment.

Owing to the scarcity and the difficulty of getting poles, due to poor transportation facilities, the various pole consuming companies in Los Angeles turned their attention, two years ago, to a preservative treatment for the wooden poles in use. Various methods have been tried by these companies—mostly applications of different oils with a brush to the outside of the pole, but these have been abandoned, to a great extent, as not giving the desired results.

Four years ago, the Pacific Light & Power Company set a pole line from its power house at Mentone to San Bernardino. Two hundred and one of these poles were treated—forty-three with carbo-lineum, one hundred and fifty-one with asphaltum and cement, the pole being first wrapped with burlap and then dipped in the compound; and twenty-five with asphaltum and cement without burlap wrapping.

Of the forty-three poles treated with carbo-lineum, twenty-seven were examined and found to be rotten through the sapwood; eighty-seven of the poles treated with asphaltum and cement, with the burlap wrapping, were examined, and seemingly all were sound, as the compound and the burlap formed a hard shell on the outside of the pole. On twenty-five of these the burlap was cut and the wood underneath examined. Fourteen were sound, and eleven rotten through the sapwood. Of the twenty-five poles treated without the burlap wrapping, twenty-one were badly rotted.

Crude oil has been used to a considerable extent in Southern California as a preservative. The method employed is not to treat the wood itself but to saturate the ground around the pole with oil and encase the pole in bitumen formed by the moisture of the oil and the earth. This method of treating poles has been used extensively, but the poles so treated have not been set long enough to show results.

Steel poles have been substituted to some extent for wooden poles on long transmission lines. On the new line of the Edison Electric Company from the power house at Kern River to the distributing stations in Los Angeles steel towers set in concrete are in use. This line is 167 miles long and transmits 40,000 horsepower. The wires are carried on insulators two feet high and are given a span of 700 feet. On the high tension distribution lines of this company a tripod-shaped steel pole is in use. The pole is built of three three-quarter round pieces of steel set in concrete one foot apart at the base and tapering to a point at the top. The steel legs are latticed from base to top. Much trouble has been caused by the leakage and induction on these steel towers, causing death to animals, fires, etc.

In Fresno the San Joaquin Light and Power Company is using poles of the Western yellow pine. Owing to the high price of poles in Fresno and to the difficulty of getting any cedar poles there the San Joaquin Light and Power Company about three years ago started using the Western yellow pine. The poles are cut in the mountains north of Fresno and are hauled in by teams. This pole has an average life of two years. In setting the pine pole the company has used two methods to increase the life—the use of crude oil mentioned above and the use of a cedar stub. The pole is strapped to a 10x10x10 cedar stub with two U bolts, the butt of the pole being kept a foot above the ground to prevent the fungus getting a hold on the pole.

The methods mentioned as being used by these companies proved unsatisfactory and two years ago several of the pole consumers in Southern California appealed to the Forest Service for help. The Forest Service started experiments in February, 1906, which are now nearing completion. Only the open tank method has been used. This consists in giving the pole a bath of hot oil followed by a bath of cold oil. The pole is placed in a tank of hot creosote oil to a depth one foot above the ground line when set and kept there from three to eight hours, depending on the condition of the wood and the penetration desired. The pole is then placed in a bath of cold oil. When the wood is heated in the hot oil, the air and moisture in the wood cells and intercellular spaces are expanded and some is driven out, and on immersion in the cold oil the difference in temperature causes the expanded air and moisture to contract, thus forming a partial vacuum which causes the oil to penetrate the wood.

The Western yellow pine is found to be a wood which readily takes treatment. In the experiments a penetration of from two to five inches of oil at the ground line, six feet from the butt, has been obtained. The Western yellow pine has a life untreated of about two years. With the treatment obtained, the life of the pole would be increased to at least twenty years. Figuring the cost of the untreated pole at $5 and its life at two years, the annual charge of the pole, exclusive of interest, is $2.50. Figuring the cost of treatment at not more than $2.50 and a life of twenty years, the annual charge, exclusive of interest, is 37½ cents as against $2.50 for the untreated timbers.

In the case of the cedar pole it has been found possible to fill the sapwood with creosote at a cost of about $2. A treatment of this kind should double the life of a cedar pole. A 40-foot cedar pole costs, set in the ground, about $15, and has an average life of 10 years. The annual charge on this pole, exclusive of interest, is $1.50. With an additional cost of $2 for treatment and a life of twenty years, the annual charge will be reduced to 85 cents.

The government considers the investigations in the preservative treatment of timbers of such importance that the business of one branch of a bureau in the Department of Agriculture—the "office of wood preservation" in the Forest Service—is given over entirely to the work of experiments in co-operation with railroad companies, mining corporations and individuals in prolonging the life of railroad ties, mine props, bridge timbers, fence posts and transmission poles. Advice and practical assistance is furnished to all who request this advice of the forester. The lengthening of life of timber means the saving of thousands of dollars annually through doing away with the heavy expense of labor and cost of material for renewals.

TELEPHOTOGRAPHY IN GERMANY.

Much attention is now paid in Germany to the remarkable measure of success which has attended the installation of Professor Korn's invention for the transmission by wire of photographic reproductions over long distances. His latest experiments show that nearly as satisfactory results are secured by making use of ordinary telephone wires as on lines specially constructed for the purpose. The only difficulty encountered on telephone wires results from calls on adjoining wires. These cause the formation of zigzag lines on the reproduced picture at the receiving station, which are easily corrected by retouching. Alterations in current intensity by ringing on or ringing off, as well as during conversations over adjoining wires, are without effect. It is further shown that the wire employed for photographic reproduction can simultaneously be utilized for telephonic conversation.

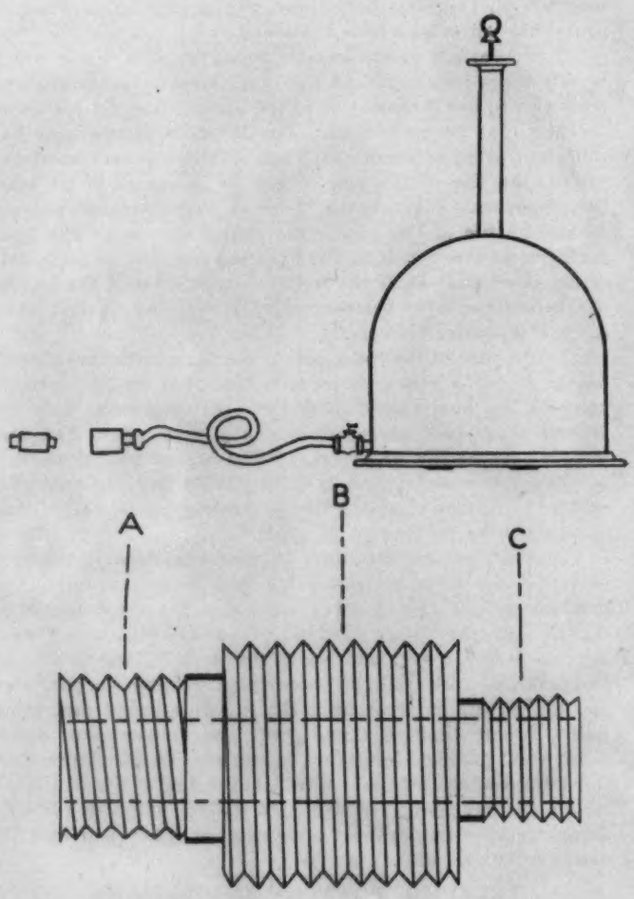
The advantages thereby accruing, to journalists more particularly, are self-evident. In these days, when so many newspapers have private wires or lease a wire to a distant city for a certain time during the night, a correspondent can telephone his dispatches and at the same time transmit the desired illustrative material. The first journal to utilize the new invention is the Copenhagen daily "Politiken," which has ordered a complete installation for telephonic and telephotographic communication with its Berlin office.

WRINKLES.*

By Geo. S. Colquhoun.

Wrinkle No. 1—Adapter for Meter Connections.

The figure represents a fitting which we use in connection with blowing-out services. It is so constructed that it will fit a five or three-light meter coupling, and can be reversed, without any trouble, to size desired.



FORCE PUMP & METER CONNECTION

NO. 1.

The connection is made to an inch coupling or reducer, which is connected to the hose leading from the air pump. "B" represents the threads which screw into the coupling and leave exposed "A," five-light meter connections, or "C," three-light meter connections, and by disconnecting the meter at the inlet and connecting the end of the fitting, the service can easily be blown out. This does entirely away with removing the lead and carrying a lot of fittings to fit the desired pipe.

The same fitting can be constructed for larger size meters.—H. B. HERYFORD.

* Paper read at Fifteenth Annual Convention Pacific Coast Gas Association.

Wrinkle No. 2—One Way of Keeping Peep Sights Clear.

The peep sights on the generators are constantly giving trouble, owing to discoloration or breaking of the glasses. This trouble is doubly bothersome under such conditions as I experienced, where new glasses could only be obtained by having them cut to order at the rate of $6.00 per one-half dozen. The following remedy was adopted: The sight-cock was removed and the nipple shortened; a gate valve, nipple, and tee were then connected to the shortened nipple, and on the end was placed the sight-cock, connected to the tee by a short nipple. We next ran a 1¼-inch pipe from the blast pipe of the generator, and connected with the tee. In this way, by manipulating the above-mentioned gate-valve, we were able to keep the peep-sight free from soot and other obstructions. There was no more trouble from blurred or broken glasses.—R. P. VALENTINE.

Wrinkle No. 3—An Alarm for High or Low-pressure Mains.

Where gas is distributed under high pressure, an excellent arrangement for giving warning against undesired drops or rises in pressure, is the following:

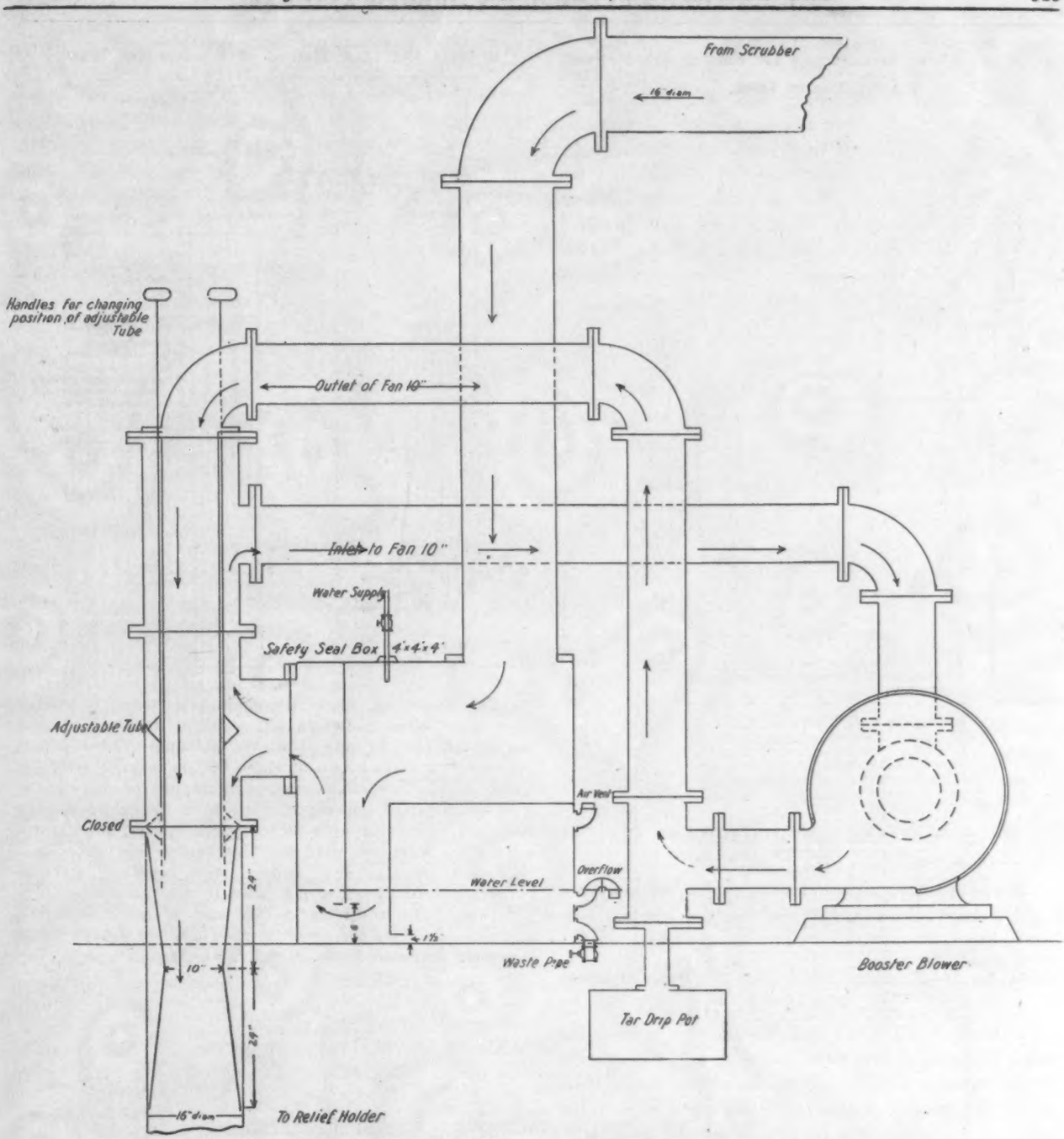
Connect a U-tube with a pipe bearing the main pressure, the tube being partially filled with mercury. Arrange electric connections at either extremity of the U, so adjusted as to form a contact when the mercury rises to a certain point in one arm of the U, as the result of exceedingly high pressure, or in the other arm of the U, as the result of exceedingly low pressure. The result of either contact is the ringing of an alarm bell, placed in some convenient place. The contrivance, if properly set up and adjusted, is a safeguard against sudden and serious pressure variations.—R. P. VALENTINE.

Wrinkle No. 4—A Fan Exhauster Set Between the Scrubbers and Relief Holder.

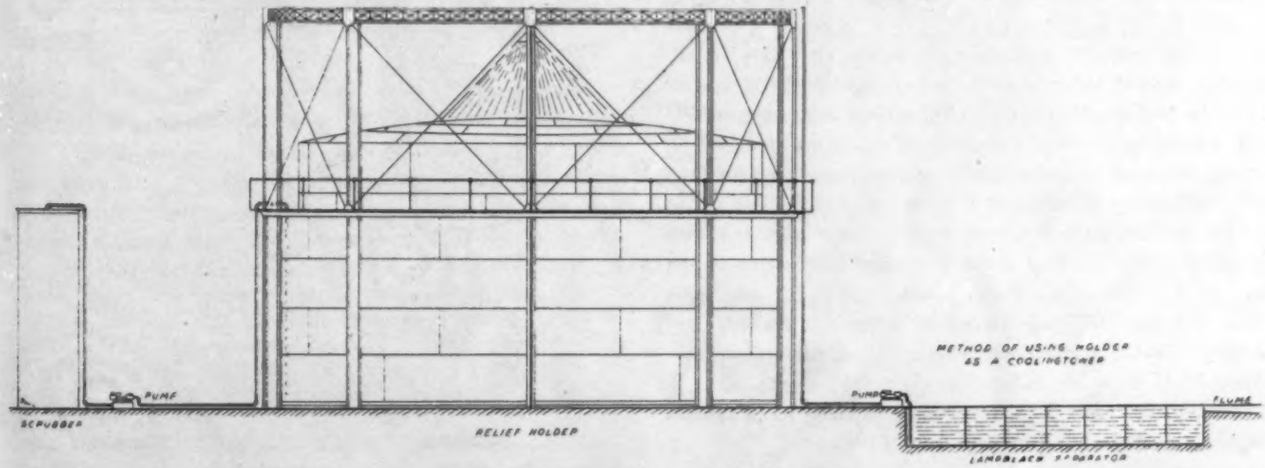
As a description, I will state that our object is to reduce the pressure on the scrubbers as much as possible, consequently reducing the pressure on the generators. To do this, and avoid the possibility of too much of a reduction of the pressure on the wash boxes, we have installed a seal box which from its construction will not allow the pressure to be reduced on the scrubber to such an extent that the blast gases could be drawn in from the generator. It will be noticed that any reduction of pressure in the outlet of the seal box would raise the water in the outlet leg of the seal box to such a height as the booster blower could lift it, but that the reserve water compartment will still keep the water line in the seal box at very nearly the same level, consequently no gas will be drawn through the box that has not sufficient pressure to break the seal.

The booster blower, as installed, draws the gas from the seal box and discharges it through adjustable injector tubes to the relief holder. While this is quite a relief on the scrubber and generator to have this pressure reduced, there is still a greater advantage in that the fan of the blower by centrifugal force separates any particles of tar that are still in the gas after scrubbing, and in operation we find quite a deposit of very good tar in the drip pot. This removal of the tar at this point is quite advantageous, as it is easily accomplished, easy to take care of, and does not allow it to pass through the exhausters and purifiers. The seal box is also supplied with a water spray, which not only keeps the water level at the proper height, but also gives an additional washing to the gas, and a considerable amount of tar is also drawn from the bottom of the seal box.

The blower is driven by a three-horsepower induction motor, but does not require that amount of power. The whole apparatus is perfectly automatic, and requires only occasional attention.—R. L. CLARK.

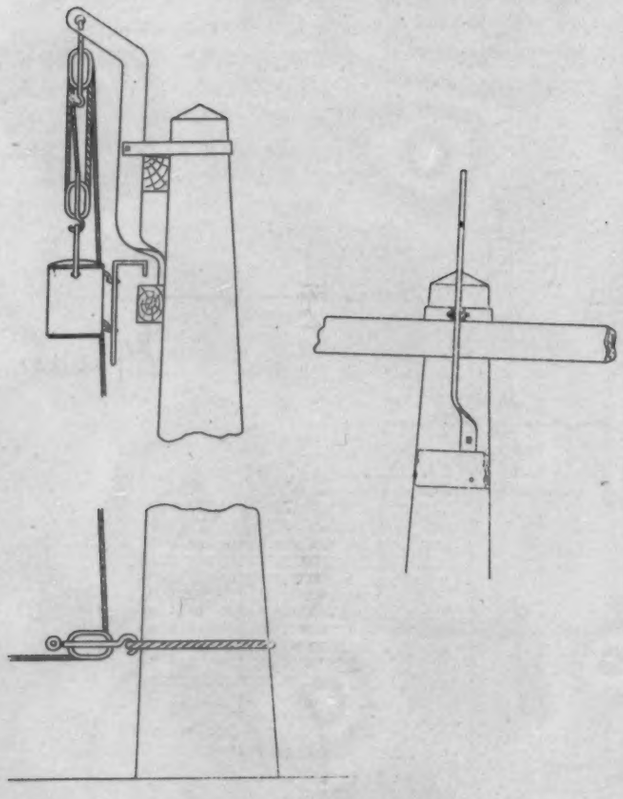


NO. 4. A FAN EXHAUSTER SET BETWEEN THE SCRUBBERS AND RELIEF HOLDER



NO. 11. HOLDER USED AS A COOLING TOWER

Wrinkle No. 5—An Arrangement for Raising Transformers to the Top of Poles.



NO. 5. ARRANGEMENT FOR RAISING TRANSFORMERS TO TOP OF POLES

The above sketches show a little device which we use for lifting transformers to the cross-arm, and which is self-explanatory.—GEO. C. HOLBERTON.

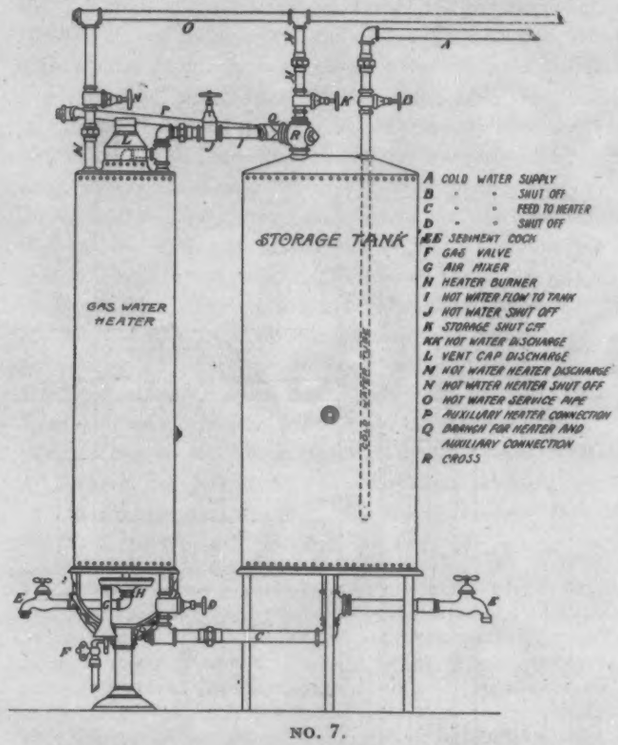
Wrinkle No. 8—Balanced Stack Valve Without Counter Weight.

The above Wrinkle was gotten up for use in operating a large and very heavy stack valve, without the use of a counter-balance, and the advantage, as will be seen, is that the full weight of the valve is utilized against the pressure of the machine, without raising the weight after the valve is let down, and is done with an ordinary large balanced valve; and it is free to act as a safety valve for any excess pressure. The counter-balancing effect is obtained, however, when needed in opening by the strain on the chain "A" exerting a force along the auxiliary arm "F," in its tendency to assume a position along the dotted line, thereby forcing it to act as a counter-balance on arm "G," and aids greatly in lifting the valve.

As an illustration of the usefulness of the auxiliary arm, which lowers away from the chain and is out of the way when the arm is up, in an endeavor to lift the valve before the arm "F" was placed in position, two men had all they could do to shoulder it up by means of a hand wheel, "E."

The valve used was forty-three inches in diameter, weighing 1,400 pounds, and was handled without trouble by the operator.

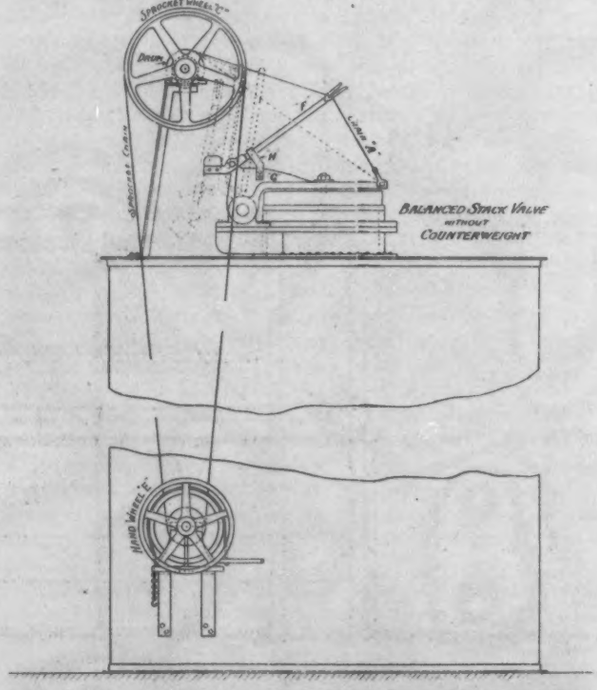
Wrinkle No. 7—A Method of Storing Hot Water.


STORAGE TANK
GAS WATER HEATER
A COLD WATER SUPPLY
B " " SHUT OFF
C " " FEED TO HEATER
D " " SHUT OFF
E SEDIMENT COCK
F GAS VALVE
G AIR MIXER
N HEATER BURNER
I HOT WATER FLOW TO TANK
J HOT WATER SHUT OFF
K STORAGE SHUT OFF
KK HOT WATER DISCHARGE
L VENT CAP DISCHARGE
M HOT WATER HEATER DISCHARGE
N HOT WATER HEATER SHUT OFF
O HOT WATER SERVICE PIPE
P AUXILLIARY HEATER CONNECTION
Q BRANCH FOR HEATER AND AUXILLIARY CONNECTION
R CROSS

NO. 7.

The above cut shows a combination boiler, connected to a large boiler in which hot water is stored, and then run to different fixtures about the building. Other details are shown by which two or three boilers may be attached, which would furnish an unlimited supply of hot water. Two combination boilers, attached to a 200-gallon storage tank, are now being used in apartment houses, and furnish all the hot water required for fifty basins, four baths, and the wash trays. These boilers were installed after oil burners and coal heaters had failed to give satisfaction.

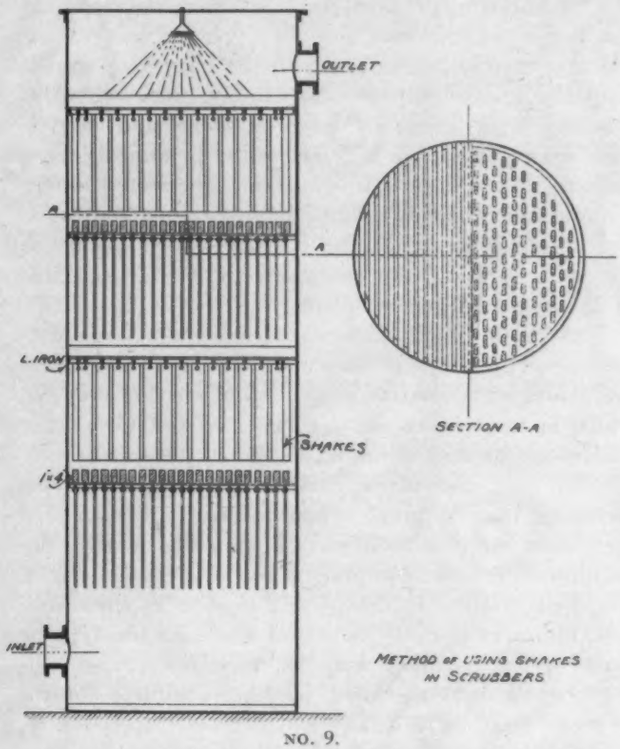
Taking into consideration the cost of labor to attend and clean up after the other burners, gas has proven to be the most economical.—F. A. LEACH, Jr.



NO. 8. BALANCED STACK VALVE WITHOUT COUNTERWEIGHT

Wrinkle No. 9—Method of Using Shakes in Scrubbers.

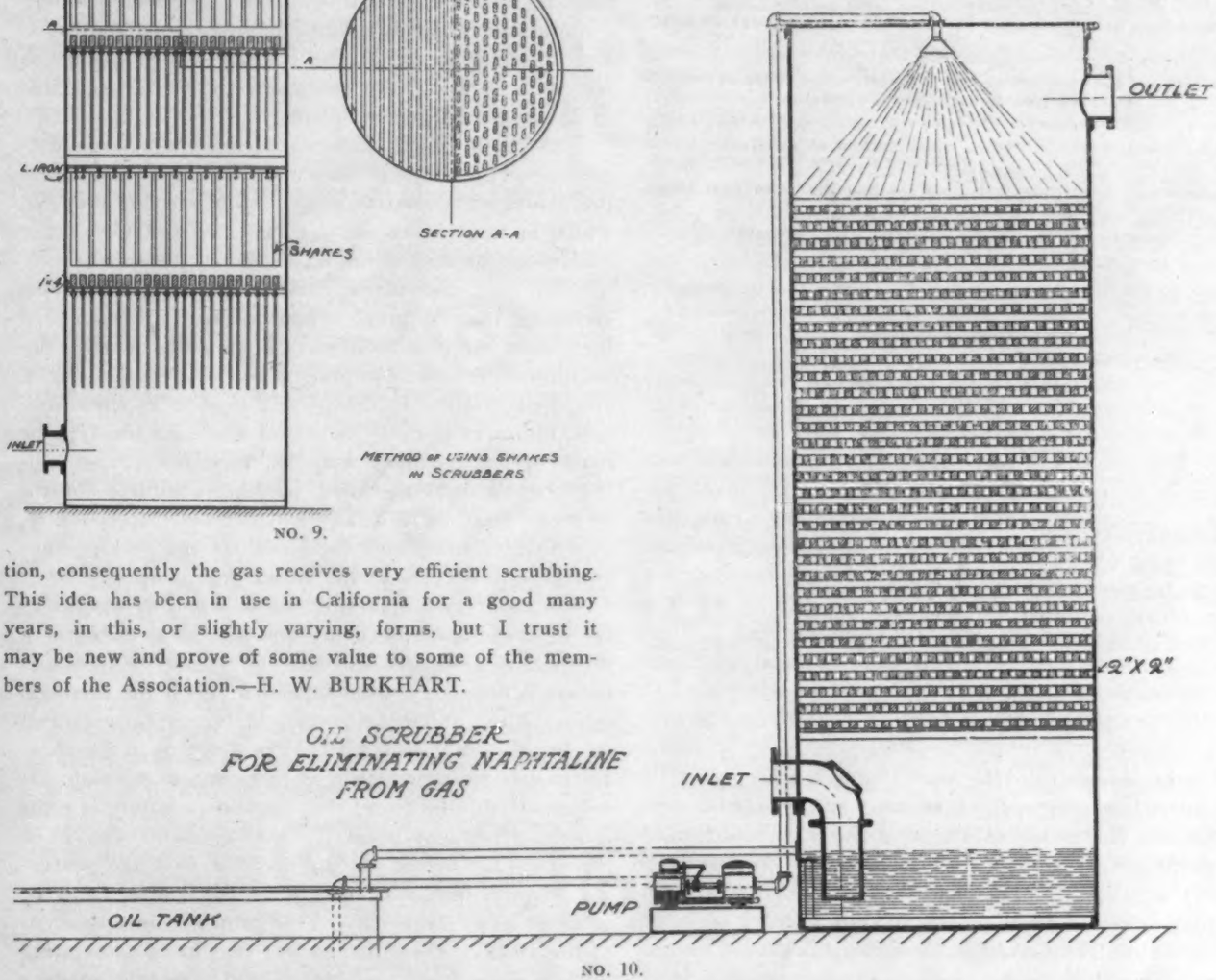
The drawing represents a method of using ordinary shakes in scrubbers. The shakes are suspended in manner shown, by inserting hooks in the 2x4 tray, and running a wire loop through the shake and hooking on to the screw hook. The water enters the top, as in any scrubber, the gas at the bottom, and as the shakes are in continual motion, consequently the gas receives very efficient scrubbing. This idea has been in use in California for a good many years, in this, or slightly varying, forms, but I trust it may be new and prove of some value to some of the members of the Association.—H. W. BURKHART.



NO. 9.

Wrinkle No. 6—A Steam-jet Ejector for Pumping Holder Drip.

We have had some collections of naphthalene and lampblack and tarry substance at the inlet and outlet to the relief holder. We were often compelled to steam it up pretty thoroughly, in order to be able to pump it out, but pumping the hot water out soon destroyed the leathers of the pump, and often required the services of a good man for half a day at a time, to get the inlet clear. We put in steam ejectors of a home-made variety, and now the whole process is easy.—JOHN D. KUSTER.



NO. 10.

Wrinkle No. 10—Oil Scrubber for Eliminating Naphthalene.

This drawing represents what we term an oil scrubber. We have taken an ordinary scrubber shell, placed 2x4 wood checkerwise therein, placed a dip pipe on the inlet, connected a pump with our oil tank, pumping the oil into the top of the scrubber, allowing it to percolate through the wood trays, the same as scrubber, using water. The oil then overflows from the bottom of the scrubber into the oil tank, and thus circulates from oil tank through scrubber, returning to the oil tank. This is a very inexpensive and efficient method of eliminating naphthalene trouble.—H. W. BURKHART.

Wrinkle No. 11—Holder Used as Cooling Tower.

Drawing represents method of using a relief holder as a cooling tower in places where the supply of water is insufficient or the rate very high. Water is pumped from the lampblack separator on to the top of the holder, and discharged thereon in the form of a spray. Another pump takes the water from the holder tank, pumping it through scrubbers. There may be some objections to this arrangement, but, on the other hand, there are some conditions wherein this arrangement would result in a considerable saving.—H. W. BURKHART.

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WITH WHICH IS INCORPORATED The Engineers' Architects' and Builders' News

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VOL. XIX OCTOBER 12, 1907 No. 15

EDITORIAL.

CORPORATIONS AND THEIR MANAGEMENT.

The relation of corporations to the public has been subject to more consideration and serious investigation during the past few years than ever before in the history of the country. Certainly the present is a period not only of activity by, but also activity against, corporations in general, and especially those identified with the important problems of transportation and industrial development.

It is admitted by all that the combination of capital, represented by the large corporations, is necessary in order to do the work upon a scale which is required under present industrial and economic conditions. This is not only true in the matter of freight and passenger transportation, but also in manufactures as well. It is but natural that with the growth and enormous development of the country a large number of transportation companies can best be operated under a single general administration. It is also true that in the industrial field a single financial, as well as operating, head can best direct not only one manufacturing plant, but many, provided, of course, the processes in the several plants are, to a certain extent, similar. Economic conditions not only justify large corporations, but actually demand them.

It is unfortunately true that the rights of the people have been most seriously ignored by some of the men who are responsible for the control of large corporations, where greed has taken the place of wisdom. There are, however, many notable exceptions, and it is to be hoped that the present rigorous investigations of the many really criminal corporations will not only result in bringing guilty managers and directors to justice, but will also serve to firmly establish the fact that there are many large corporations, which are practically monopolies in their own field, that have been honestly managed, and which have given the public the advantage of all improvements and advances made as a result of their development and larger organization.

One fact in connection with the large corporation is of the utmost importance, namely, that not withstanding their great increase in scope and control, their management to be efficient is, in almost every respect, identical to that which may be found where a single individual owns and directs a small business, and in reality occupies the position which is, in the larger corporation, the composite of president, board of directors and general manager.

As in the small business, so with the large corporation, it is the personality and the individuality of the manager, no matter what his official title may be, which in most cases establish at once and for all the future, the success or failure of the corporation.

The thorough investigation of typical companies, including their original organization, the object of their incorporation, their early history and general development, present equipment, and scope of business, and their relation to the public, as well as their success, indicates in every case that whatever the type or name of the company may be, it is really the individual, or man at the head, who has complete control of every detail of its affairs and has the responsibility, to whom we must give the credit for the development and general success of the entire organization.

Investors are invariably called upon to answer to the best of their ability the question as to whether a prospective company will succeed or not. Success or failure is not necessarily dependent upon the financial interests, the individual stockholders, or the wealth of its directors, nor is it solely dependent upon the character of business which it is proposed to develop. It will invariably be found that success or failure is most largely dependent upon the management, and it is, therefore, far better for the investor to make searching inquiry into this feature of the matter, and be satisfied as to the ability of the proposed maangement of the affair, rather than to feel that he is associating himself with other men who have, as a rule, made a success of their affairs. It is also necessary to know whether or not the proposed board of directors will give complete and able support to the man intrusted with the general management. Personal differences of individual stockholders and directors have been responsible for as many failures in corporate development as perhaps any other single thing.

Under most conditions, experience, which is coupled with success, is required in order that any man may be a successful general manager. It is he who must necessarily know all about the details of the business. It is usually he who must decide when

it is wise to spend money and when it is desirable to retrench. It is he who must judge of the ability and the loyalty of his co-workers. It is the head of the organization who must develop opportunities for his company, and at the proper time be ready to take advantage of the changed conditions which may result from such efforts. It is, of course, necessary for all of his associates to do their part as well as they possibly can, but for the most part their work will be more or less detail, and in but few cases will they be responsible for the policies and principles which must be decided by the head of the organization.

For these reasons general managers receive, and can properly demand, large salaries. The ordinary person is given to think that it is impossible for any man to earn honestly the salaries that some general managers receive; nevertheless, it is a fact that greater ability is required to honestly and faithfully direct the interests of a great corporation than would be required if dishonorable dealings, bribery and graft are resorted to in order to ostensibly advance the interests of a company.

It cannot be denied by any one that the extensive and almost phenomenal development of transportation, electric light, power, gas and telephone companies, has done more to increase the wealth of every individual, as well as the country as a whole, during the past decade, than all other influences combined. When, however, a corporation resorts to bribery or other dishonest methods to eliminate competition, the object is in every case to defraud the public, and the influence of such corporations, no matter what the extent of their development may be, is to increase the injustices and wrongs which are heaped upon the people, the elimination of which is now being attempted.

PERSONAL.

A. H. Babcock, electrical engineer for the conversion of Alameda Mole steam road into an electric system, has returned to San Francisco, from New York.

S. K. Colby, treasurer of Pierson, Roeding & Co., and A. N. Hargrove, manager of their car department, have left for the East, to attend the National Street Railway Convention, to be held at Atlantic City.

TRADE CATALOGUES.

"The Story of How the New Bremen Electric Light Company, New Bremen, Ohio, Sells $8.50 Worth of Electric Current to Every Man, Woman and Child in the Town," as written by F. H. Plaice, has been reproduced by the Co-operative Electrical Development Association of Cleveland, Ohio, for general distribution.

September "Bulletin and Question Box," of the National Electric Light Association, in addition to valuable answers and suggestive questions in the "Question Box," a brief but comprehensive article on "Municipal Ownership," by Arthur H. Grant, and one on the "Association Twenty Years Ago," by T. C. Martin.

BELL TELEPHONES SOLD TO ALL.

Interview with President Vail, of the American Telephone and Telegraph Company.

The Western Electric Company, who manufacture the apparatus used by The Bell Companies, will hereafter sell telephones and supplies to all buyers. President Theodore N. Vail, of the American Telephone and Telegraph Company, has had the idea under consideration for a long time, but heretofore one difficulty had been that the Western Electric Company needed more plant, its full energies being required to supply the demands of the Bell Companies alone. This obstacle to doing a general business has been overcome by the recent completion of very large additions to the Chicago factory of the Western Electric Company, and hence it is now in a position to take care of outside orders. In reply to a question as to the probable effect of this action on the revenue of the American Telephone and Telegraph Company, Mr. Vail said that no considerable direct increase was anticipated, but that a great indirect advantage was looked for from improved relations between the public and all of the associated Bell Companies, because there has been an entirely erroneous idea more or less prevalent that the charges of these companies for their services were based on a monopoly of telephone instruments, while the fact is that the instrument is but a small part of the plant required in giving telephone service. It is felt that this action may cause it to be more clearly understood by the public that the Bell Companies' only claim for patronage is based on their ability to furnish the best service at reasonable prices, and not on any instrument monopoly. Mr. Vail explained that at the present time many inefficient telephone instruments are in use on local and private lines, and that the Bell Companies desire to see those replaced by standard instruments, in order that it may make traffic connections with the greatest possible number of properly-equipped lines, assuring proper service and transmission. For example, there are thousands of so-called "Farmer lines" which will furnish valuable feeders for the toll lines of the larger system, when properly equipped and maintained. This situation can now be provided for through the sale, outright, of Bell instruments and apparatus. In answer to the question as to whether it was intended that the Western Electric Company should become an aggressive competitor of the independent manufacturers who, up to this time, have had a monopoly of the selling trade, the only reply was that the Bell interests were fully prepared, either from the manufacturing or operating side of the business, to meet all the needs of the public, and that they wish to demonstrate that they claim or ask no advantages other than their ability to meet those needs under square competitive conditions of quality and price.

CIVIL SERVICE EXAMINATION.

The United States Civil Service Commission announces an examination on October 23, 1907, to secure eligibles from which to make certification to fill a vacancy in the position of engineer, at $900 per annum, in the Courthouse and Postoffice Building, Salt Lake City, Utah, and similar vacancies as they may occur in the Custodian Service in any city in the United States.

AN ERRONEOUS IMPRESSION.

It has come to the notice of the "Journal" a number of times recently that the water-wheel damaged at Electra, Cal., was of Pelton make. We have investigated the matter and found that this is an error.

LOCAL STOCKS AND BONDS

Furnished by Courtesy San Francisco Stock and Bond Exchange.

Outstanding	INTEREST	MISCELLANEOUS BONDS.	OCT. 3		OCT. 4		OCT. 5		OCT. 7		OCT. 8		OCT. 9	
			Bid	Asked	Bid	Asked	Bid	Asked	Bid	Asked	Bid	Asked	Bid	Asked
1,532,000	F & A	Associated Oil Co. 5%	....	80	....	80	....	80	....	80	....	80	....	80
2,250,000	M & S	Bay Counties Power Co. 5%	92¾	....	92¾	....	92¾	....	92¾	....	92¾	....	92¾	....
1,000,000	F & A	Cal. Central Gas & El. 5%	....	100	....	100	....	100	....	100	....	100	....	100
9,600,000	M & S	Cal. Gas & El. Gen. M. & C. T. 5%	69	72	....	70¼	69¾	....	69	....	69	70½	69¾	70
900,000	J & J	California St. Cable Co. 5%	....	102½	....	102½	....	102½	....	102½	....	102½	....	102½
2,000,000	J & J	Contra Costa Water Co. 5%	....	100½	....	100½	....	100¼	....	100½	....	100½	....	100½
1,000,000	J & J	do do Gen. Mtg. 5%	....	92½	....	92½	....	92½	....	90	....	91	....	90
623,000	F M A N	Edison Light & Power 6%	109	112	109	112	109	112	109	112	109	112	109	112
650,000	M & S	Ferries & Cliff Ho. Ry. 6%	....	....	....	....	....	....	....	....	....	....	....	....
671,000	A & O	Geary St. Ry. 5%	50	80	50	80	50	80	50	80	50	80	50	80
610,000	M & N	Honolulu R. T. & L. Co. 6%	105	....	105	....	105	....	105	....	105	....	105	....
300,000	A & O	Lake Tahoe Ry. & T. Co. 5%	....	....	....	....	....	....	....	....	....	....	....	....
500,000	J & J	Los Angeles Elec. Co. 5%	....	100	....	100	....	100	....	100	....	100	....	100
1,300,000	J & J	Los Angeles Gas & Elec. Co. 5%	....	100	....	100	....	100	....	100	....	100	....	100
5,000,000	A & O	Los Angeles Ry. 5%	....	108	....	108	....	108	....	108	....	108	....	108
1,000,000	A & O	Los Angeles Lighting Gd. 5%	....	100½	....	100½	....	100½	....	100½	....	100½	....	100½
1,500,000	A & O	Los Angeles Pac. R. R., 1st Con. Mtg. 5%	100½	....	100½	....	100½	....	100½	....	100½	....	100½	....
3,030,000	M & S	L. A. Pac. R. R. of Cal. 5%	....	100	....	100	....	100	....	99	....	99	....	99
3,000,000	J & J	Market Street Cab'e 6%	105½	107	105½	107	106	107	106	107	106	107	106¼	107
5,141,000	M & S	do Ry., 1st Cons. Mtg. 5%	....	102	....	102	....	102	....	102	....	102	....	102
100,000	A & O	Mill Valley & Mt. Tamalpais S.Ry.5%	103	....	103	....	103	....	103	....	103	....	103	....
4,751,000	A & O	Northern Ry. Co. of (Cal.) 5%	110	....	110	....	110	....	110	....	110	111	110	....
1,498,000	J & J	North Pacific Coast R. R. 5%	....	101½	....	101½	....	101½	....	101½	....	101½	....	101½
1,074,000	J & D	Northern Cal. Railway 5%	105	....	105	....	105	....	105	....	105	....	105	....
980,000	J & D	Northern Cal. Power Co. 5%	....	95	....	95	....	95	....	95	....	....	....	95
6,000,000	A & O	Northern Electric Co. 5%	....	....	....	....	....	....	....	....	....	....	....	....
1,000,000	M & S	Oakland Gas Light and H. 5%	101½	105	101½	105	101½	105	101½	105	101½	105	101½	105
1,374,000	J & J	Oakland Transit Co. 6%	109	....	109	110¼	109	110¼	109	110	109	110	109½	110
1,600,000	J & J	Oakland Transit 5%	102	....	102	....	101½	....	101½	....	101½	....	101½	....
1,326,000	J & J	Oakland Transit Con. 5%	100	103	100	103	....	102½	....	102½	....	102½	..	102½
7,000,000	J & J	Oakland Traction Con. 5%	....	99	....	99	....	99	....	99	....	99	....	99
1,500,000	J & J	Oakland Water Co. gtd. 5%	....	100	....	95	....	95	....	93	....	95	....	95
2,000,000	A & O	Omnibus Cable Ry. 6%	....	110	....	110	....	110	....	110	....	110	....	110
1,149,000	S D M J	Pacific Gas Imp. 4%	....	92½	....	92½	....	92½	....	92½	....	92½	....	92½
8,494,000	J & J	Pacific Electric Ry. Co. 5%	100	103½	100	103½	....	101	....	101	....	101	100	102
4,491,000	J & J	Pacific Light & Power Co. 5%	....	98	....	98	....	98	....	98	....	98	....	98
3,000,000	J & J	Pacific Tel. & Tel. Co. 5%	....	102½	....	102½	....	102½	....	102½	....	102½	....	102½
350,000	J & J	Park & Cliff House Ry. 6%	....	104	....	104	....	104	....	104	....	104	....	104
250,000	J & J	Park & Ocean R. R. 6%	....	104	....	104¼	....	104¼	....	104¼	....	104¼	....	104¼
700,000	M & S	Powell Street Railway 6%	....	....	....	....	....	....	....	....	....	....	....	....
2,500,000	M & N	Sacramento Elec. Gas & Ry. 5%	....	100	....	100	....	100	....	100	....	101	....	101
6,000,000	A & O	S. F. & S. J. Valley Ry. 5%	110	111	110	111	110	111	110	110¾	110	111	110¼	111
3,000,000	J & J	S. F., Oak. & San Jose Ry. 5%	100	103¾	....	103¾	....	103¾	....	103¾	....	103¾	103½	....
1,500,000	J & J	do do 2d Mtg. 5%	....	....	....	....	....	....	....	....	....	....	....	....
1,500,000	A & O	S. J. & S. Clara Co. R. R. 4½%	....	....	....	....	....	....	....	....	....	....	....	....
642,000	A & O	Sierra Ry. of Cal. 6%	105	110	105	110	105	110	105	110	105	110	105	110
6,000,000	J & J	S. P. R. R. of Arizona 6% (1909)	101½	....	101½	....	101½	....	101½	....	101½	....	101½	....
4,000,000	J & J	do do do (1910)	....	....	102½	....	102½	....	102½	....	101¾	102¼	101¾	102¼
5,116,000	A & O	S. P. R. R. of Cal. 6% (1912)	105	....	105	....	105	....	105	....	105	....	105	....
4,127,500	M & N	S. P. R. R. of Cal., 1st c. gtd. 5%	112½	....	112½	....	112½	....	112½	....	112½	....	112½	....
3,533,000	A & O	S. P. Branch Ry. of Cal., 6%	121½	....	121½	....	121½	....	121½	....	121½	....	121½	123
81,178,000	J & J	S. P. R. R. Co., 1st Ref'd'g. 4%	90⅝	91½	89¾	91	90	....	89	90	89	91	89	....
17,500,000	J & D	Spring Valley Water Co. Gen. Mtg. 4%	85½	....	86	87	85¾	87½	85½	....	85½	87	85½	87
300,000	M & S	Stockton Gas & Elec. Co. 6%	....	105	....	105	....	105	....	105	....	105	....	105
2,000,000	J & J	United Gas & Elec. Co. 5%	....	....	....	....	....	....	....	....	....	....	....	....
20,000,000	A & O	United R. R. of S. F. 4%	67½	68½	67¾	68½	67¾	68¼	67½	68½	67	69	....	68
2,500,000	M & N	Valleys Counties Power Co. 5%	92½	....	92½	....	92½	....	....	95	....	95	90	95
		Water Stocks.												
....	....	Contra Costa	....	62	....	62	....	62	....	62	....	62	....	62
6,000	Quarterly	Marin County	45	....	45	....	45	....	45	....	45	....	45	....
280,000	....	Spring Valley Water Co.	20	21	20	20½	20	20½	20	20½	19⅞	....	20	20¼
		Gas and Electric Stocks.												
37,500	....	Martel Power Co.	....	....	....	....	....	....	....	....	....	....	....	....
9,340	....	Mutual Electric Light Co. (Ctfs.)	4½	....	4½	....	4½	....	4½	....	4½	....	4½	....
37,336	....	do (Extended Ctfs.)	13	....	13	....	13	....	13	....	13¼	....	13½	....
40,000	Monthly	Pacific Lighting Co.	65	....	65	....	65	67½	65	67½	65	....	65	....
12,000	....	Stockton Gas & Elec. Co.	52	....	52	....	52	....	52	....	52	....	52	....
		Street Railroad Stocks.												
10,000	....	California	....	135	....	135	....	135	....	135	....	135	....	135
10,000	....	Geary	....	35	....	35	....	35	....	35	....	35	....	35
10,000	....	Presidio	....	25	....	25	....	25	....	25	....	25	....	25
	Semi-an.	Associated Oil Co.	27¾	....	28	29	27¾	28½	28	28½	28	28½	28	28½
1,625	Quarterly	Mill Valley & Mt. Tamalpais S. Ry.	....	110	....	110	....	110	....	110	....	110	....	110
180,000	Quarterly	Pac. Tel. & Tel. Co. (Pfd.)	80	81	80	81	80	81	....	81	....	81	....	81
180,000	....	Pac. Tel. & Tel. Co. (Common)	10	....	10	11	10	....	10	....	10	....	10	....

Unlisted Securities

750,000	A & O	Bay Counties Power Co. 6%	97	....	97	....	97	....	97	....	97	....	97	....
745,000	M & S	Blue Lakes Water Co. 6%	....	....	....	....	....	....	....	....	....	....	....	....
2,000,000	A & O	California Northwestern Ry. 5%	....	108	....	106	....	106	....	106	....	106	....	106
160,000	J A J O	Marin County Water 5%	....	100	....	100	....	100	....	100	....	100	....	100
600,000	J & J	Risdon Iron Works 5%	....	100	....	100	....	100	....	100	....	100	....	100
500,000	M & S	S. F. Dry Dock 5%	100	109	100	109	100	109	100	109	100	109	100	109
8,000,000	M & N	S. F. Gas & Electric 4½%	....	95	....	95	....	95	....	95	....	95	....	95
3,926,000	J & J	S. F. & North Pacific Ry. 5%	....	104	....	104	....	104	....	104	....	104	....	104
5,500,000	J & J	South Pacific Coast Ry. 4%	....	90	....	90	....	90	....	90	....	90	....	90
....	....	Standard Electric Co. 5%	....	85	....	85	....	85	....	85	....	84	....	82½
....	....	do do Gtd. 5%	....	85	....	85	....	85	....	85	....	85	....	85
750,000	J & J	Sunset Tel. & Tel. Co. 6%	....	....	....	....	....	....	....	....	....	....	....	....
2,250,000	A & O	Sunset Tel. & Tel. Co. 5%	....	103½	....	103½	....	103½	....	103½	....	103½	....	103½
1,000,000	M & N	Sutter Street Railway 5%	....	103	....	103	....	103	....	103	....	103	....	103
		Stocks.												
50,000	Monthly	Gas Consumers' Association	17½	20	....	20	....	20	....	20	....	20	....	20
100,000	Monthly	Northern Cal. Power Co.	24	25	24⅛	25	24⅜	25	24	25	24⅜	25	24⅜	25
....	....	Pac. Gas & Elec. (Pfd.)	....	47½	....	47½	....	47½	37½	45	37½	45	37½	44
....	....	Santa Cruz Port. Cement	....	50	....	50	....	50	....	50	....	50	....	50
....	....	Standard Port. Cement (New)	40	50	40	50	40	50	....	50	....	50	....	50
50,000	Monthly	Truckee Electric Co.	14	....	14	....	14	....	14	....	14	....	14	....

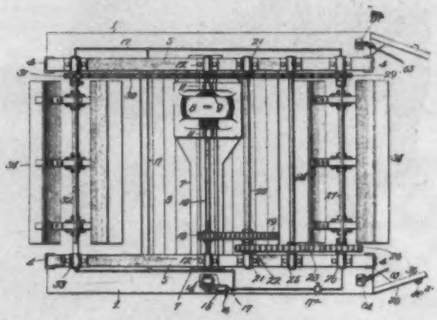
PATENTS

Electric, Gas and Water.

Specially reported for the Journal of Electricity, Power and Gas.

RAIL MAGNETIC BRAKE. 867,147. Victor L. Ochoa, New York, N. Y., assignor of one-half to Benjamin A. Jackson, New York, N. Y. Filed January 5, 1907. Serial No. 350,889.

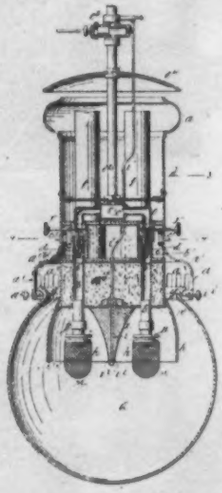
In a device of the character herein specified, a magnet



core consisting of a tube, divided longitudinally at one side and having projecting poles; a longtitudinal winding of exciting wire within and without the tube, and means for suspending said magnet from a car in close proximity to the rail, substantially as shown and described.

GAS-LAMP. 867,219. Appious C. Swain, Jersey City, N. J. Filed June 29, 1907. Serial No. 381,387.

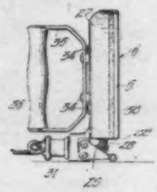
In a lamp of the character designated, the combination with a plurality of burners, burner tubes and connections, of a partition above the burners separating them from the lamp casing and contents, an annular apron forming a continuation of said partition extending downward and circumscribing the burners to form a combustion chamber, a plurality of chimney flues opening through said par-



tition and arranged to conduct the products of combustion from said combustion chamber, a closed chamber above said partition inclosing the adjacent portions of said chimney flues and the adjacent portions of the burner tubes and pilot tube, and a packing of non-conducting material surrounding the portions of said chimney flues, burner tubes and pilot tube, extending through said inclosed chamber, for the purpose described.

ELECTRIC LAUNDRY-IRON. 866,810. Earl H. Richardson, Ontario, Cal. Filed October 10, 1906. Serial No. 338,234.

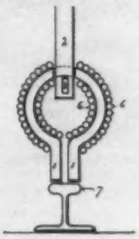
A device of the class described, comprising a body having a recess; a wire wound core detachably secured in said recess; binding posts secured to said body, the ends of the



wire on the core being connected with the binding posts; a cover detachably secured to said body; binding posts secured to said cover, said binding posts adapted to connect with the first named binding posts through fuses; and fuses interposed between said binding posts.

ELECTRIC CONTACT RAIL AND SHOE. 867,021. George Drawert, Chicago, Ill. Filed May 14, 1906. Serial No. 316,670.

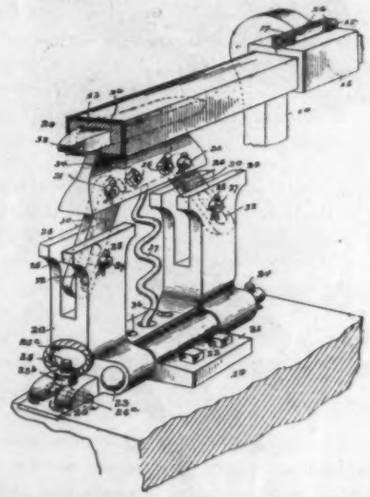
The combination of an electric contact rail having an undercut groove along its lower surface designed to ac-



commodate a contact shoe, a standard pivotally mounted on a car below said rail, a contact shoe adapted to travel in said undercut groove and contact with the ledges of said rail provided by said groove, links connecting said shoe and standard, said links being pivoted to said shoe and having a pin and slot connection with said standard, means to maintain said standard in an upright position, and a wire connecting said shoe and standard, substantially as described.

FLOATING POWER PLANT. 867,192. James W. Dawson, San Francisco, Cal., assignor of one-fourth to Robert W. Gees, Kansas City, Mo. Filed September 13, 1906. Serial No. 334,437.

A floating power plant provided with one or more pad-



dle-wheels to be rotated by the current, a dynamo, means for transmitting motion from the wheel to the dynamo, one or more motors at any desired distance from the dynamo, and means actuated by the electricity generated by the dynamo, to raise the latter and the paddlewheel or wheels.

INDUSTRIAL

ELECTRIC HEATING AND COOKING DEVICES FOR MARINE USE.

The great advantages of electricity in the way of simplicity, safety and flexibility have led to its almost universal adoption as a means of illumination on shipboard, so that today even the smallest tugboat has its own electric plant; but shipowners and builders have not as yet fully appreciated

LUMINOUS RADIATOR

its equal superiority as a producer of power and heat. On land the use of the electric motor for power purposes is now as general as electric lighting and the last few years have se n the beginning of a widespread movement to adopt electricity for heating and cooking as well.

Recognizing the vast possibilities in this new application of electricity, the General Electric Company has developed a variety of special devices which have already won such favor that it seems certain they will be as commonly used as the incandescent lamp. As this company has been closely identified from the first with the introduction and growth of

AIR HEATER

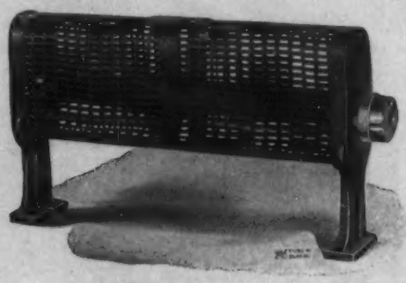
electric lighting on shipboard, and has constantly recommended electric power for ship auxiliaries, it now desires to call attention to the very special advantages of electric heating and cooking devices on board ship.

A ship's lighting plant, usually of more than ample capacity for its intermittent load, offers at once an available source of supply, which, utilized for cooking in the galley or heating in the staterooms, would provide numerous real and profitable conveniences with small increase in cost.

Radiators.

The electric heater is ideal for stateroom use. It is compact and neat in appearance and easily turned on and off, thus admitting of regulation of temperature for each individual room. It is connected by simple wiring which is more flexible than steam piping. The wires take little space and can be run anywhere, while steam pipes are bulky and apt to leak, and necessarily heat the spaces through which they pass. It is safe to say that the electric radiator, although deriving its heat indirectly from steam, is no less efficient when the losses due to leakage and radiation are taken into consideration.

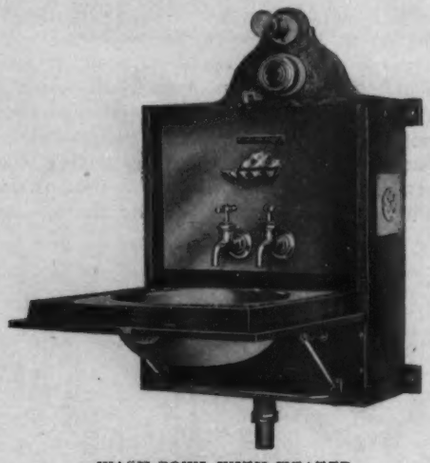
Two types of electric heater have been made, the luminous, consisting of large incandescent bulbs, or glowers, in front of a copper reflector, and the non-luminous air heater,



STATEROOM HEATER

in which heat is distributed by natural circulation of air through special resistance coils. The luminous type gives quick heat by means of radiation, and with its pleasant glow would be an attractive substitute for an open fire in the smoking room, saloon, or writing room of a passenger steamer.

The non-luminous heaters are, however, better adapted to continuous service in heating rooms or spaces.



WASH BOWL WITH HEATER

Water Heater.

Another service to which electricity may be put is in furnishing hot water in the stateroom, and the convenience of the electric shaving mug, one or two-quart water heater,

PARTS OF ONE QUART HEATER

or the electric washbowl fed from a small tank in which a heating unit is immersed, will readily be appreciated. The wash-bowl is primarily designed simply to take the chill off

the water on boats running through the winter in Northern waters, but the shaving mug and small water heaters will furnish boiling water in a few minutes.

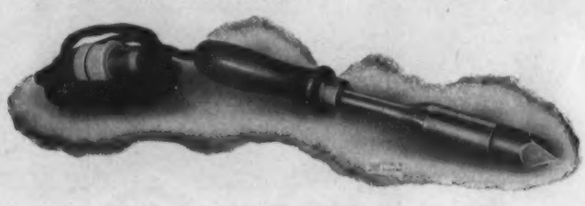
Cooking and Laundering.

For cooking and laundry work a large line of standard

SHAVING MUG

devices is offered. There is the chafing dish, disk stove, egg boiler and coffee percolator for the cabin or wardroom, and various grids, broilers, frying pans, combination cookers, teakettles, water urns, and continuous flow water heaters for the galley, as well as several sizes of ovens which, with the absence of live coals and the facility of temperature regulation, at once commend themselves as safer and more efficient than any other form of stove for marine installation. To meet all requirements for ironing or pressing in the laundry sizes of flatirons from three to twenty-four pounds can be supplied.

In addition to the heating and cooking appliances men-



SOLDERING IRON

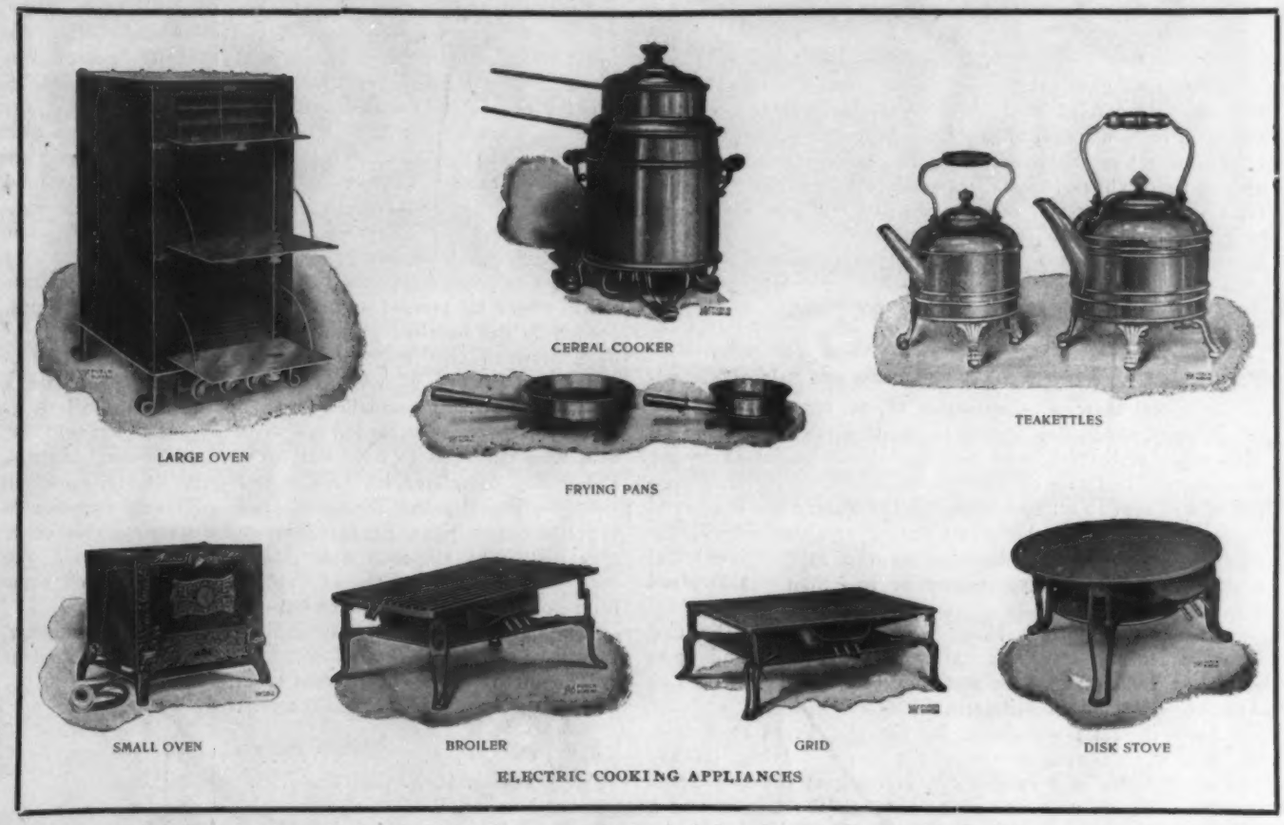
tioned above, special devices, as electric soldering irons, gluepots, curling iron heaters, hospital sterilizers, heating pad, disk stoves for heating poultices, cigar lighters, etc., will all find their place in workshop, suite, smoking room, or sick bay.

Construction of Heating Units.

Two distinct forms of heating elements are used by the General Electric Company: the Cartridge and Quartz

IRON WITH INDICATING SWITCH

Enamel units consist of a thin tape of special resistance metal, wound edgewise, insulated with a fireproof cement



ELECTRIC COOKING APPLIANCES

and then inserted in a mica lined brass tube capped with a cement plug through which the leading-in wires are brought. The Quartz Enamel unit is made up of a resistance wire

QUARTZ ENAMEL UNIT

wound in a coil of small diameter which is then coiled into the form of a flat spiral with mica insulating strips between its convolutions and held against a layer of Quartz grains imbedded in enamel on the bottom of the heater. Both heating units are practically infusible and indestructible, but can be readily replaced if damaged by accident. Great care

has been taken in the design of the heating devices to insure the most efficient application of the heat and at the same time to give proper radiating surface so that nearly all the apparatus may be left in circuit indefinitely without fear of burnout.

All the smaller devices are portable and fitted with flexible cord and plug by which they may be connected to any lighting circuit in the same way as a portable lamp. They

CARTRIDGE UNIT CIGAR LIGHTER

are regularly carried in stock and samples may be seen and full information regarding them obtained, at any of the branch offices of the General Electric Company. The larger appliances, such as heaters, washbowls and ovens are made on a special order and can be supplied within a reasonable time. The company invites correspondence in regard to heating and cooking outfits for any type or size of vessel.

THE SANTA CRUZ OUTING.

For Those Interested in the Manufacture and Sale of Electrical Material—September 27, 28, 29, 1907.

A very successful outing to Santa Cruz took place on September 27th, 28th, and 29th, by those interested in the manufacture and sale of electrical material. A general invitation was sent to all companies on the Pacific Coast to send representatives, with the result that over thirty-five of the most prominent men interested in the sale of electrical goods were present, representing no less than one hundred separate institutions.

The representatives from San Francisco left the city in a private car, on Friday afternoon, the 27th, and upon arrival at Santa Cruz were met by representatives from Los Angeles, Portland and Seattle.

An early start was made for the Big Trees at Felton, on Saturday, September 28th, the party leaving on the 7:30 a. m. train, in a special car, arriving at the Big Trees at 8:30 a. m. A visit was made through the Grove, and a stop long enough to permit the official photographer to take the picture shown here.

Reading from left to right. Upper row—R. D. Holabird, Holabird-Reynolds Electric Co.; Walter M. Fagan, Telephone & Electric Equipment Co.; B. F. Kierulff, Jr., B. F. Kierulff, Jr., & Co.; F. H. Poss, Benjamin Electric & Mfg. Co., Holophane Co.; W. E. Allen, J. R. Cole Co., Seattle.

Middle row—W. A. Landry, Dunham, Carrigan & Hayden; W. R. Dunbar, Westinghouse Elec. & Mfg. Co.; C. E Winchell, H. W. Johns-Manville Co.; H. C. Thaxter, Standard Electrical Works; S. A. Knoche, Dunham, Carrigan & Hayden; H. W. Carter, Pacific Electric Works; W. W. Graham, Holabird-Reynolds Electric Co.; Franklin Overbaugh, Overbaugh & Ayres Mfg. Co., Chicago; L. A. Nott, Standard Underground Cable Co.; W. R. Greene, H. W. Johns-Manville Co.; Garnett Young, Telephone & Electric Equipment Co.; E. M. Scribner, Western Electric Co.; C. G. Pyle, Standard Underground Cable Co.; W. I. Otis, California Electric Works, San Francisco; Richard Spencer, California Electric Co., Los Angeles; A. W. Brode, Brode Electric Co.; —— Smith, American Steel & Wire Co.; J. A. Vandegriff, Bryan, Marsh Co.; J. B. Pridham, H. W. Johns-Manville Co., Los Angeles.

Lower row—P. S. Benjamin, American Steel & Wire Co.; C. I. McColgan, C. I. McColgan Co.; H. C. Baker, Crocker-Wheeler Co.; H. D. McGill, Crescent Co., Valparaiso, Ill.; T. E. Bibbins, General Electric Co.; C. C. Hillis, Electric Appliance Co.; Albert H. Elliot, host; W. S. Brown, Kilbourne & Clark Co.

There were also in the Grove at the time, but who escaped the range of the camera:

Geo. R. Cole, John R. Cole Co.; E. M. Fobes, Fobes Supply Co.; A. W. Ballard, General Elec. Co.; A. B. Vandercook, Telephone & Elec. Equip. Co.; Frank Fowden, Brooks-Follis Elec. Corp.; Mrs. A. H. Elliot, Mrs. T. E. Bibbins, Mrs. Geo. R. Cole, Mrs. C. C. Hillis, Mrs. W. R. Dunbar, Mrs. E. M. Scribner.

After the trip through the Grove, the party continued on to Felton, to the country home of Mr. A. H. Elliot, where refreshments were served, and all were "shown" his new garage, some daring to predict that the garage was more elaborately fitted than his beautiful cottage. After a short rest, a walk was taken through the grounds of the beautiful Zayante Reserve to Sulphur Springs, returning over a very circuitous mountain trail, arriving at Zayante Inn in time for luncheon, which had previously been arranged.

During this most enjoyable feast, selections were rendered by the Electra Sextette, composed of Messrs. Fowden, Bibbins, Elliot, Poss, Scribner and Holabird.

At 1:40 p. m. start was made for the return trip to Santa Cruz, where all arrived at 2:30 p. m., and immediately proceeded to the baseball grounds, where a baseball game was held between two selected teams, composed of Manufacturers and Sellers, with A. H. Elliot acting as arbitrator, a task which he was compelled to abandon after three innings of play. He was succeeded by the Honorable Frank Fowden, who managed to hold out for three additional innings, and finally completed his task in the sixth inning, at which time the game ended, owing to a tie score and inability of the contesting sides to agree upon an umpire who could give justice to all, each side claiming the other side had certain influences over the available candidate through some future order which they might have to place.

The game ended after six of the most strenuous innings, as will be proven by the following score, which of itself does not begin to tell of the misdeeds performed.

Manufacturers.

	R.	E.	B.H.
Cole, C. F.	2	9	4
Young, L. F.	2	5	0
Dunbar, P.	3	2	5
Baker, 1st B.	3	5	3
Allen, S. S.	3	7	2
Fagan, C. and R. F.	4	9	2
Kierulff, 2d B.	2	8	3
Vandercook, 3d B.	1	6	4
Elliot, R. F. and C.	2	5	2
	22		

Sellers.

	R.	E.	B.H.
Carter, 1st B. and C. F.	0	9	1
Fowden, 3d B.	5	5	4
Goodwin, P. and C.	5	0	5
Thaxter, 2d B.	1	6	3
Carter, Jr., S. S.	3	4	4
Holabird, 1st and C. F.	3	1	4
Scribner, R. F.	2	11	1
Landry, P. and C.	3	2	5
Knoche, L. F.	0	5	1
	22		

R. D. Holabird, Walter M. Fagan, B. F. Kierulff, Jr., F. H. Poss, W. E. Allen, C. E. Winchell, W. W. Graham, W. R. Greene, L. A. Nott, W. J. Otis, A. W. Brode, W. A. Landry, W. R. Dunbar, H. C. Thaxter, H. C. Carter, F. Overbaugh, C. O. Pyle, Garnett Young, E. M. Scribner, R. Spencer, Smith, J. A. Vandergriff, J. B. Pridham, P. S Benjamin, C. I. McColgan, H. C. Baker, H. D. McGill, T. E. Bibbins, C. C. Hillis, Albert H. Elliot, W. S. Brown.

Home Runs:—Goodwin, 2; Fowden, Thaxter, Landry, 3. Base Hits:—Goodwin, 2; Fowden, Thaxter, Landry, Cole, Dunbar, Fagan, Holabird, Elliot. Double Plays:—Goodwin to Fowden. Struck Out:—by Dunbar, 1; by Landry, 9; by Goodwin, 7. Passed Balls:—Elliot, 7; Landry, 5; Fagan, 8; Goodwin, 1. Stolen Bases:—Geo. Cole, 8. Hit by Pitcher Dunbar.

The party then proceeded to the bathing pavilion, where all enjoyed a salt-water dip.

At 7:30 sharp, all assembled at Banquet in the Arts Room of the new and beautiful Casino.

Beautiful menu cards consisting of an engraved menu card placed on the inner side of highly-polished abalone shell, suitably engraved, announced the courses.

Upon completion of the menu, the following toasts were responded to:

A. H. Elliot—"How I Secured a Country Home."

T. E. Bibbins—"Own Your Own Home."

C. C. Hillis—"How I Tamed Wild Bill."

P. S. Benjamin—"How to Sell Wire."

G. A. Young—"Why Manufacturers' Agents Exist."

Geo. A. Cole—"Selling Goods at Cost."

Franklin Overbaugh—"Trade in Chicago."

A. W. Ballard—"Why We Boom Real Estate."

J. A. Vandergriff—"The Best Lamp."

H. V. Carter—"Why Amusement Companies Are More Profitable Than Electric Companies."

F. H. Poss—"What is Holophane?"

H. C. Thaxter—"How I Became a Physician."

E. M. Scribner—"The Cost of Operating Automobiles."

At midnight all retired to Cottage City, to enjoy a well-earned rest and be prepared for the voyage around Monterey Bay, scheduled for Sunday at 11 a. m.

On Sunday morning those who were brave enough to attempt the trip assembled at 11 a. m., and a trip was made around Monterey Bay on the launch "Sinnaloa." Through the kindness of the captain, rough water was generally avoided, and the trip was thoroughly enjoyed by all.

Upon the return all joined in a swim in the surf, luncheon in the grill, and the party returned home in a private car, reaching San Francisco at 9:30 p. m., Sunday night.

All pronounced the trip a very successful one, and many similar ones are planned for the near future.

NEWS NOTES

ELECTRIC RAILWAYS.

Bellingham, Wash.—Stone & Webster have secured most of the right-of-way along the water-front of Chuckanut Bay, south of Bellingham, and are now working for the same privileges in Skagit County. When this work has been completed, they should be ready to start construction work on the Whatcom-Skagit County interurban.

Spokane, Wash.—It is probable that there will be a two-mile extension of the Manito Park line of the Spokane Traction Company, from its present terminus to Moran Prairie. Residents along rural free delivery route No. 3 have placed the matter before Jay P. Graves, head of the Inland Empire System, and it is said they have assurance that the line will be extended.

Seattle, Wash.—Councilman William M. Hines, of the Twelfth Ward, is giving assistance to capitalists who may decide to build a street car line from the present terminus of the Seattle Electric Co.'s line on Beacon Hill, down through the hill district to Dunlap, a distance of three miles. Application will be made in due time to the City Council for a franchise for a street car line through that district, which Councilman Hines declares is due to become one of the residential beauty spots of Greater Seattle.

Albany, Ore.—Surveyors for the Salem-Eugene electric line, which is being planned by A. Welch and associates, have now proceeded southward as far as Jefferson, and will soon reach this city. Welch has secured franchises for street railway lines in Salem, Albany and Eugene, and the fact that a permanent survey is being made, indicates that he will carry out his plan of connecting the three cities with a line. A power plant will be built near Vida, on the McKenzie; work to commence at once.

Vancouver, Wash.—A meeting of the Washington Railroad & Power Company, which has the franchise for building the street railway system in Vancouver, was held in this city last week. The company was reorganized, and the following officers elected: Senator E. M. Rands, president; J. H. Elwell, vice-president; H. C. Phillips, treasurer; M. M. Connor, secretary. Joseph Connor will be superintendent of the work of construction. The company as organized has secured control of all the stock. W. H. Moore, of Portland, the former president of the company, will leave his interests in, and these amount to considerable, for between $25,000 and $50,000 has already been spent in material and equipment and in grading and laying several miles of track in the city.

Seattle, Wash.—The Seattle Electric Co. was given a permit to construct a new steel and concrete counterbalance to take the place of the wooden one on the east tracks of the Queen Anne Hill line. The Board of Public Works almost decided to refuse the permit until next March, but as the company has arranged to take care of the East Queen Anne traffic by way of the Cedar Street line, it was decided to allow the street to be torn up this winter. The company is getting ready to operate its big cars on the hill, and will double the lifting power of the counterbalance. "Y's" were authorized by the Board, to be built on the new Nineteenth Avenue line, on the Fifteenth Avenue north line, and on the extension to the Wallingford Avenue line at Sixty-fifth Street and Latona Avenue, in order that the big cars could be put in operation on those lines.

Centralia, Wash.—B. J. Weeks, of Tacoma, who has just resigned his position as general manager of the Pacific Traction Co., is to promote and build a new electric line, to be known as the Centralia-Chehalis and Western Railway Co. The company will build eight miles of road between Centralia and Chehalis, and a two-mile branch to connect with a freight center. It is stated that $150,000 worth of bonds for the new line has already been subscribed and that numerous good freight contracts are offered guaranteeing the new line excellent business. F. B. Hubbard, of the Eastern & Western Railway & Lumber Company, is to be president of the new company, and many of the stockholders are said to be the same as those of the Pacific Traction Co. of Tacoma, a fact which leads many Centralia people to believe the two lines will eventually hook up together, giving a through electric road from Tacoma. Reliable report has it that the Guggenheim interests are back of the Pacific Traction Co., and will also be interested in the new line.

TELEPHONES.

La Grande, Ore.—The Home Tel. Co., composed of local business men, is advertising for bids for construction of a plant to cost $30,000. A franchise was granted some weeks ago.

Havre, Mont.—The Havre & Box Elder Telephone Company held a meeting Wednesday and instructed the committee to draw up a contract to install the line. Two thousand dollars has already been subscribed and everything is moving right along.

Dayton, Wash.—J. W. Estep and Charles McMorris, who have been working for the Pacific Telephone Company for the last several months, have gone to North Yakima, where they will construct a Government telephone line between Fort Simcoe and Wapata.

Port Orchard, Wash.—Kitsap County has, through its Commissioners, granted a fifty-year franchise to the Independent Telephone Company of Seattle. The company is granted the right to erect poles and maintain lines on all public highways in the county, except streets in incorporated cities.

Wilson Creek, Wash.—The County Commissioners have set the 9th and 10th of October as the date on which they will hear the application for franchise for two more rural telephone lines. The Larene Farmers' High Line Co. will be heard on October 9th, and the Wheat Ridge Telephone Co., on October 10th.

Victoria, B. C.—"A petition is being circulated for signature at Mayne Island and vicinity," said A. Inglis, of Mayne Island, who was in the city yesterday, "asking that a cable be laid to the Island and telephonic communication established. It is held that such service is necessary, and would be of much utility in the winter months, when steamers are tied up there on occasions for shelter."

St. Joe, Ida.—The new long-distance telephone line between Spokane and St. Joe, Idaho, owned by the Interstate Telephone Company, was opened last week. The line is 140 miles long, and is claimed to be the best long-distance connection with that country. It is built with thirty-foot poles and heavy wire, and is only opened twice between Spokane and St. Joe.

TRANSMISSION.

City of Mexico—Chas. H. Cahan, attorney of the Mexican Light & Power Company, Ltd., states that a second great hydraulic plant on the Necaxa River has been decided upon. It will be installed near Huachinango, and will cost $5,000,000. R. F. Hayward is the general manager.

Redlands, Cal.—F. C. Finkle, consulting engineer of the Edison Electric Company, is looking over the works of the company at Mill Creek and Santa Ana Canyons, and taking observations for the new power house to be put in next year to use the waters of Bear Creek. This will be taken through a tunnel partly constructed. Mr. Finkle states that the work on Arrowhead Dam will require two or three years.

Los Angeles, Cal.—Sealed bids will be received until 11 a. m., October 7th, for furnishing hydraulic and electrical machinery and line material for equipping one hydroelectric generating plant, 90 miles of 30,000-volt transmission line and transformers, as per specifications on file. Check of five per cent, payable to president of the Board of Works, and additional bond of twenty per cent. Bidder to state earliest date of delivery he can guarantee.

Oroville, Cal.—E. L. Cleland, a farmer in the Big Bend section, has obtained an injunction against the Great Western Power Company, prohibiting the company, its agents, servants, attorneys, etc., from entering upon Cleland's farm and cutting trees, or branches of trees, or hauling away timber or wood. The Great Western Power Company has been building a road over Cleland's 160-acre farm, and declares the work will be continued. For the damage done, Cleland asks $1,000 and costs of the action in court.

Willows, Cal.—The Directors of the Snow Mountain Electric Power Company have decided when active construction work will begin on its three miles of flume and its power house. The company now has 1,000,000 feet of lumber at its power site, and 80,000 more sawed and hauling from its mill. The mill has been closed down for two weeks, awaiting the pleasure of the Government, from which it is now purchasing timber rather than move its mill to its own timber. It is proposed to run the mill all winter, if the weather will permit. It is figured that it will require nearly 1,000,000 feet of lumber to construct the flume, which will be five feet wide, four feet high and three miles long.

San Francisco, Cal.—The Mono Power Company, backed by Edson F. Adams of Oakland, which has expended about $40,000, has closed contracts for a temporary power plant to furnish electric lights and compressed air for driving the water tunnel leading to the initial generating plant on the Owens River. The tunnel is now in 500 feet, but the work will be rushed in future, and it is to be completed in six months. It is to be 7x7 feet and 8,000 feet in length, through a hard trappite rock. It will require about 5,000 barrels of cement for the concrete lining. The carrying capacity of the tunnel is 300 seconds feet. Work has been commenced on five cross-cuts that will expedite the driving of the tunnel. A dam of concrete diverts the water for the plant. The power will be transmitted about 100 miles to Goldfield and the principal mining camps of Nevada. The temporary plant that has been contracted for includes a 200-horsepower Ingersoll air compressor, driven by a Platt Iron Works water wheel, and a 75-kilowatt generator, to supply electric power for lights and fans. The Schaw-Batcher Company has taken the contract to install 220 feet of 40-inch and 300 feet of 36-inch steel pressure pipe for the temporary installation. A three-mile road has been completed at an expense of $25,000 into the so-called "Impassable Canyon," where the main power plant is being constructed, at a point twenty miles north of Bishop, Cal. Bids have been received on the three large generators which are to be installed in a chamber cut into the ledge of rock, just above the water in the canyon, but some of the details may have to be changed before making awards.

TELEPHONE AND TELEGRAPH.

Eureka, Cal.—The City Council opened bids on the telephone franchise, September 24th.

Red Bluff, Cal.—Responsible parties are requested to submit bids for the construction of forty-two miles of telephone line from here to the property of the California & Massachusetts Copper Mines Company.

San Diego, Cal.—The United States wireless station was in communication, September 20th, with the cruiser Chicago, which had passed south about 100 miles at sea, and was at that time about 250 miles down the Coast from San Diego.

Bakersfield, Cal.—Arrangements have been completed with the Sunset Telephone Company for the connection of the proposed Weedpatch line with the Bakersfield exchange, which will give the patrons of the rural line unlimited use of the entire local system. At present, it is understood, the system will consist of three loops, the shortest of which will be five miles long, and the longest, seventeen. It will commence at Offer's Resort. Present figures show it will take five tons of Mo. 12 wire to build the three loops, and one ton of Mo. 14 wire will be used in running the side lines. Poles will be set thirty-five to the mile.

INCORPORATIONS.

San Francisco, Cal.—The Central Electric Company has been incorporated with a capital stock of $25,000, by L. R., H. W. and J. L. Boynton. The place of business is San Francisco.

Napa, Cal.—Articles of incorporation have been filed by the Napa Valley Electric Company, with a capital stock of $200,000. The company will conduct a general electric and gas lighting, heat and power business.

Florence, Ariz.—The Florence Water, Light, Ice & Power Company has been incorporated with a capital stock of $50,000. The Directors are Dr. G. M. Brockway, P. A. Chamber and A. C. Sieboth. The purpose of the company is to build waterworks, an ice plant, a gas plant and an electric light and power plant in Florence.

TRANSPORTATION.

Riverside, Cal.—W. W. Poole, of the Southern California Cement Company at Crestmore, states that steps have been taken for an electric line between Riverside and the plant.

Long Beach, Cal.—The Pacific Electric Company has asked the Council for three franchises. One is for a line on Eleventh Street, and the others for more tracks. Action was deferred one week.

Stockton, Cal.—The City Council has passed the ordinance granting the Central California Traction Company a franchise to construct a spur track from the present end of the line at Center Street to a point along the water from nearly opposite the west end of the freight sheds of the California Navigation and Improvements Company.

Hanford, Cal.—The Trustees have passed a resolution ordering that sealed bids be received up to 8 p. m., October 7th, for the sale of the franchise applied for recently by F. S. Granger, to run for a period of fifty years, an electric interurban railroad. Each bid must be accompanied by a certified check of ten per cent of amount bid. Jas. A. Hill, clerk.

Los Angeles, Cal.—Secretary Zeehandler will ask the Directors of the Merchants' and Manufacturers' Association to take up the agitation of the project urged by E. E. Crandell, president of the Crandell Investment Company, namely, the offer of a long-term river-bed franchise to the Pacific Electric Railway Company. An official of the latter company states that no such franchise is desired, as a track there would cost $100,000; also that a $1,000,000 track would have to be built.

Kennewick, Wash.—The first consignment of fifty tons of machinery for the big power plant at Priest Rapids has been shipped from the factory of the Allis-Chalmers Company at Milwaukee. The machinery will be immediately taken up the river on the steamer Mountain Gem, and will be stored at Priest Rapids for installation as soon as the concrete work and building of the power house is completed. The river is now low, so that work can be begun and the reinforced concrete buildings for the machinery will be quickly erected. All the cement for these buildings is on the ground now, as well as the copper wire for the transmission lines. Another mammoth steam shovel has been put to work on the power canal, and work on all parts of the plant is progressing with rapidity.

San Francisco, Cal.—The following statement is given out at Harriman headquarters: All question as to the immediate execution of the plans to electrify its trans-bay lines, east of San Francisco, has been disposed of by the closing of contracts aggregating between $800,000 and $900,000 for the Fruitvale power house. This central station will serve the Oakland, Berkeley, Alameda and Fruitvale lines, besides making provision for future needs. Including the expenditures for sub-stations and overhead work, the cost of carrying out these plans is in the neighborhood of $2,000,000. The contracts were let in New York, by A. H. Babcock, electrical engineer of the Southern Pacific Company. The Parker Boiler Company, of Philadelphia, received the order for boilers; H. R. Worthington, for condensers and steam auxiliaries; the Westinghouse Machine Company, for the turbines and generators, and the General Electric Company, for motors and other car equipment.

Napa, Cal.—The threatened legal battle between the San Francisco, Vallejo and Napa Valley Electric road and the town authorities of St. Helena, over the route of entrance to be followed into the town by the road's up-valley extension, will not occur, the difficulting having been amicably adjusted. From the beginning, it had been the plan and intention of the electric people to cross Main Street, St. Helena's principal thoroughfare, near the southerly limits, and then parallel, as closely as possible, the Southern Pacific's line to cross Sulphur Springs Creek. About a week ago, however, some eighty of the leading citizens and business men of the town petitioned the Town Board to have the electric road follow the west side of Main Street, along the creek, and cross the creek west of the town bridge. President Botsford, General Manager L. J. Perry, and several of the other Directors of the road, visited St. Helena several days ago, and after thoroughly studying the situation, decided that, notwithstanding the additional expense, they would follow the route desired by the citizens of the town, sooner than have any trouble over the matter. Work will be rushed, and the road will be running into the up-valley town within a few weeks after a daily-expected shipment of rails arrives.

OIL.

Bakersfield, Cal.—According to report, another new refinery is in prospect for the Sunset fields. The company to enter upon this enterprise is the New Center Oil Company, which leases forty acres of the land in the Sunset fields. The company is composed of San Francisco capitalists, with Charles A. Son at the head of their financial operations. Mr. Reynolds, as field superintendent, is authority for the statement that work will be commenced soon on the up-to-date plant.

San Francisco, Cal.—The largest lease of California oil lands in years, and involving millions of dollars, is credited to the Union Oil Company. That corporation has just closed a deal for 14,000 acres near King City, in the San Joaquin Valley. The details of the deal have not been given out. A deal was closed recently in the Pleasant Valley country, in which a royalty of a quarter of the oil produced and $500 an acre additional, was agreed upon as the terms. On that basis the deal just made by the Union Oil Company would represent $7,000,000 in cash and an indefinite, but large, prospective royalty. The struggle to get possession of oil territory is increasing every month. Large areas of water are becoming more and more a bad factor. Oil at the wells, if the independents can carry out their plans, soon will be worth fifty cents a barrel. A second meeting of producers will be held in a few days, to try to raise the price to this figure. A story has been current in the offices of oil brokers that a great gas pressure exists near Petaluma. Oil men are investigating.

FINANCIAL.

Oceanside, Cal.—The City Council has adopted Ordinance 130 specifying the form of the water improvement bonds and containing the final steps in the issue of the same. The validity of this $30,000 bond issue has not yet been passed upon. The engineer will prepare specifications for the machinery for the plant. It is thought it will be six months before this can be obtained.

Oakland, Cal.—Damages to the amount of $310,435 are asked for by Judge Henry A. Melvin, his wife, Sarah Louise Melvin, and Senator G. Russ Lukens, from the Oakland Traction Company, for injuries received by the trio as the result of the collision of an automobile in which they were and an electric car, on September 26, 1906. The suit is based primarily on the fact that the car was traveling on the wrong track.

Los Angeles, Cal.—Charging that T. S. C. Lowe, as president of the People's Gas & Coke Company, is attempting to convert to his own use, or that of some corporation in which he holds stock, bonds of the company to the amount of $520,000, W. N. Goodwin, a director of the People's Company, has brought suit in the Superior Court to restrain the Title Insurance & Trust Company from delivering the bonds. It is set up that the People's Gas & Coke Company is legally authorized to incur an indebtedness of $5,000,000, par value, signed by President Lowe and certified to by Secretary C. R. Taylor. The bonds were placed in possession of the Title Insurance & Trust Company, and to secure payment on the bonds the gas interests placed in possession of the Title Insurance & Trust Company, conveying all of its property, the understanding being that the bonds were to be sold subject to the order of the Board of Directors. It is alleged President Lowe presented an order to the defendant, purporting to be signed by himself and the secretary, ordering the Title Insurance & Trust Company to deliver the bonds to a corporation or persons unknown to the plaintiff. It is contended in the complaint that the order was given without the knowledge of the Directors.

WATERWORKS.

Sawtelle, Cal.—The Santa Monica Land & Water Company has awarded to J. H. Knapp the contract for completion of a dam in the Sepulveda Canyon.

Phoenix, Ariz.—Engineer Howard Reed has finished his estimates and plans for the remodeling of the municipal water system. The further distribution of the present supply will be the extent of the improvements at this time. Fire hydrants will be installed, and pipe from six to ten inches in capacity.

San Diego, Cal.—The Southern California Mountain Water Company has awarded a contract to Robert Sherer & Company, to bore four tunnels, dig ditches and haul lumber for Dulzara conduit line, running from Barret Dam to Dulzara Divide. The tunnels will aggregate 13,010 feet, and price is $13 per linear foot.

Oakland, Cal.—Plans and specifications for the salt-water fire-fighting plant proposed by Councilman Pendleton, have been completed, and are now in the hands of City Engineer Turner, for revision and approval. As soon as the plans have been approved by Turner they will be presented to the City Council for final adoption. It is hoped that the work of installing the salt-water plant will be commenced during the present fiscal year, as the need for such auxiliary fire-fighting apparatus is growing more apparent. The plans which have been prepared provide for a pumping plant, a building in which the pumps, motors and engines will be located, and estimates of the cost of the necessary distributing mains over the area to be covered by the auxiliary system. The estimated cost of the pumping plant and the building in which it is to be installed, is $50,000. The cost of the distribution system will depend upon the amount of territory covered by the salt-water mains.

ILLUMINATION.

Long Beach, Cal.—The city officials are now considering the project of erecting a municipal gas plant on the five-acre tract, near the harbor, owned by the city.

Antioch, Cal.—The men of the Antioch Oil Company, while drilling for oil south of Antioch struck a strong flow of natural gas, which was ignited and burned until put out.

Pasadena, Cal.—Superintendent C. C. Glass estimates the cost of the improvements contemplated at the municipal electric plant at $195,000. Expert Scattergood places the figures at $245,000. Because of this difference of opinion, Professor C. L. Cory has been appointed to make a closer examination of the project. Bonding for this project may come up soon.

Fresno, Cal.—At the meeting of the Board of Trustees, Mayor Lyon suggested, before considering the electric light franchise matter, that it would be a good plan for the Board to order an ordinance that all electric wires be placed underground in the thickly-populated district. The suggested district was K Street on the east, Merced on the north, H on the west and Kern on the south.

San Francisco, Cal.—The Supervisor's Artificial Lights Committee has decided to install five arc lamps in Larkin Street, from Market to Sutter, and took under advisement the restoration of thirty arc lamps in McAllister Street, from Larkin to Fillmore. The committee had ordered sixty arc lamps removed from McAllister Street, which caused a protest from property owners. The gas lamps, however, will be removed, as the arc lights are considered adequate illumination. The committee ascertained that it would cost $2,175 to install lights in the vicinity of Hunter's Point, and the California Drydock Company will be asked to bear the expense. Supervisor Sullivan urged that the Mission be given more lights, and some of the lights on Van Ness Avenue dispensed with.

TELEPHONES.

Centralia, Wash.—The N. W. Long Distance Tel. Co. will install a fire alarm system for this city.

Fairbanks, Alaska—Manager Hamilton is trying to interest capital in a line from this place to Valdez.

Conconnully, Wash.—A new line by a new company is proposed to be built between this place and Twisp. L. H. Bowman, chairman of committee.

Anaconda, Mont.—J. C. Ball, of the Independent Tel. Co., has begun overhead work for the system to be installed here. It will be ready for operation in thirty days.

TELEPHONES.

Spokane.—Pacific States T. & T. Co. has commenced erection of a sub-exchange on Sinto Avenue east of Jefferson Street. It will be a two-story clinker brick and cost $20,000.

Conconully, Wash.—It is said that the Pacific Tel. & Tel. Co. is endeavoring to lease its lines in Okanogan County for a rental which will cover its taxes, alleging that the line does not pay expenses. Patrons claim service rendered has not been of a nature to justify necessary patronage.

Salem, Ore.—Mayor Rodgers, acting for the council, agreed to allow Manager Varney, of the Northwest Long Distance Tel. Co., to string wires temporarily during the fair, or until a franchise is secured in regular manner. This is a result of the determination of the N. W. Tel. Co. to install its system by reason of a purchased franchise granted to other parties.

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Brooks-Follis Elec. Corp.
California Electrical Works
Century-Klein Electric Co.
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General Electric Co.
Holtzer-Cabot Elec. Co.
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Tel. and Elec. Equipment Co.
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Elevators
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Cutter Co., The
Century-Klein Electric Co.
Fort Wayne Electric Works
General Electric Co.
Tel. and Elec. Equipment Co.
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Electrical Machinery
California Electrical Works
Northern Electrical Mfg. Co.
Standard Electrical Works
Century-Klein Electric Co.

Electric Polishers
Northern Electric Mfg. Co.

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Electrical Supplies
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Century-Klein Electric Co.
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Engineers, Chemical
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Engineers, Electrical
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Tracy Engineering Co.
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